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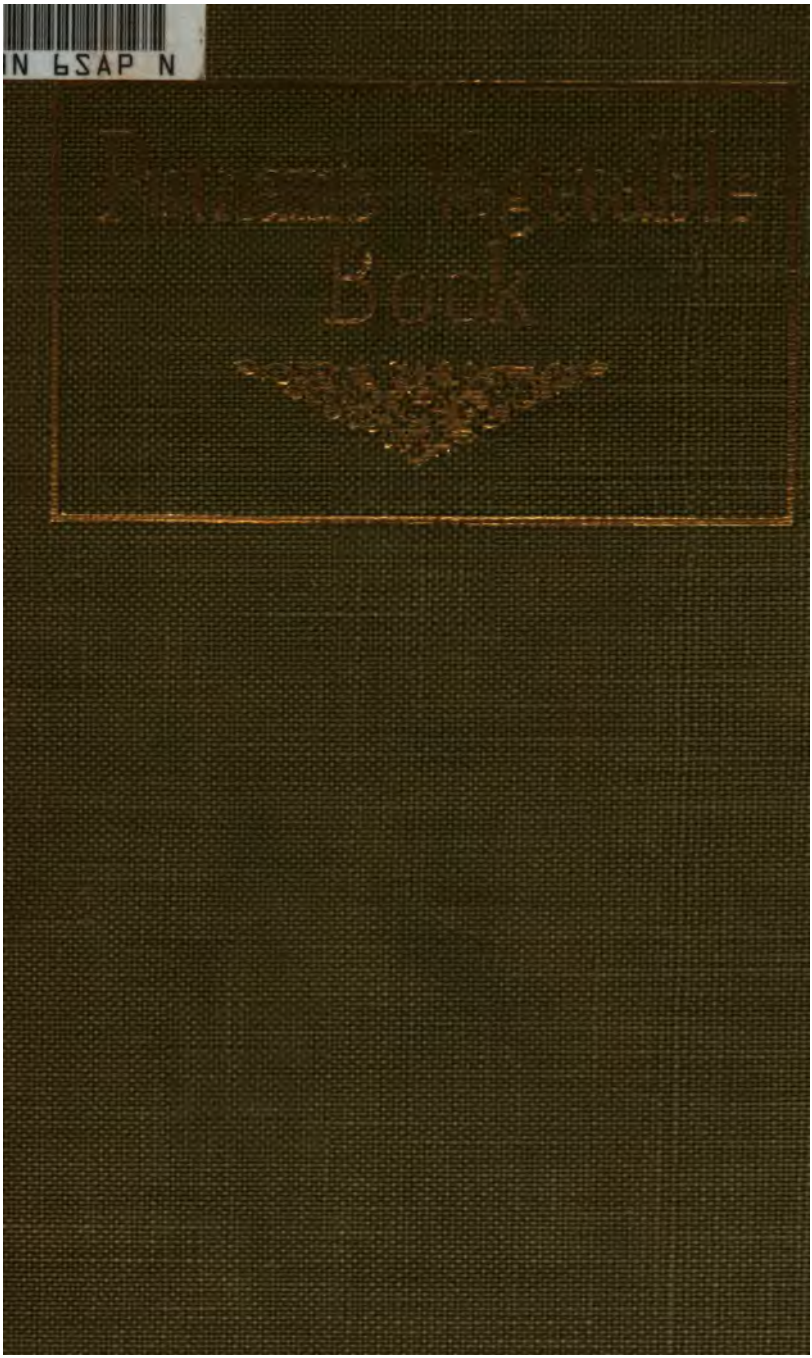

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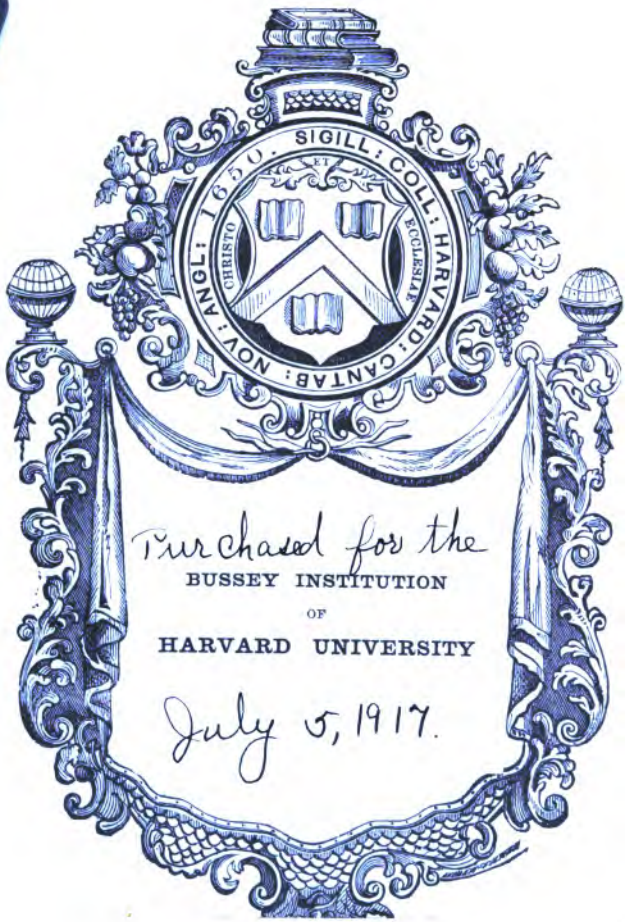

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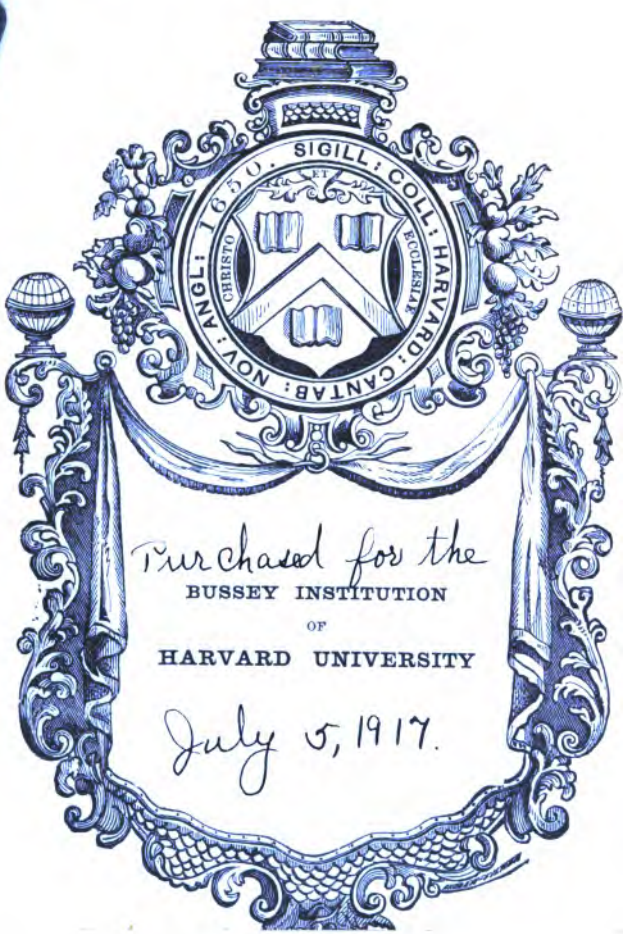

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By Mae Savell Croy

Putnam's Household Handbook

Putnam's Vegetable Book

Putnam's Handbook for Mothers

Putnam's Garden Handbook

Putnam's Vegetable Book

By

Mae Savell Croy

Author of
"Putnam's Household Handbook," "Putnam's Garden Handbook," "Putnam's Handbook for Mothers," etc.

G. P. Putnam's Sons
New York and London
The Knickerbocker Press
1917

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(Under the title *1000 Hints on Vegetable Gardening*)

The Knickerbocker Press, New York

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ARTICHOKES

Artichokes require a deep, rich, sandy loam, with plenty of well-rotted manure. The seed should be planted as soon as the soil is warm in the spring, and when the plants have grown two good leaves they should be transplanted to rows set two or three feet apart.

Artichokes do not produce until the second season, hence it will be necessary to cover them during the winter with straw or manure. In resetting, use side shoots from the old base.

In planting Jerusalem artichoke tubers, set them in drills three inches deep and eighteen inches apart. In very rich soil, they need not be planted

so deep. The tubers may be left in the ground throughout the winter and dug as used.

ASPARAGUS

Asparagus will grow well in a variety of soils, the one condition being to avoid too much moisture. A rich, sandy loam is the best soil, as it will grow warm earlier in the spring than a heavy soil.

Up-to-date asparagus growers always grow their own plants. The seed should be sown as early as the climate and weather will permit, and it pays to use the very best seed regardless of cost.

Asparagus seed are very slow to germinate, often requiring several weeks. Germination may be hastened by soaking the seed in warm water for two or three days before planting. The water should be kept warm all of the time, by setting on the back of the stove or placing it over a very small flame, but it should not get really hot.

In purchasing asparagus plants, secure "crowns" at least two years of age. This will enable you to have asparagus much earlier than by planting seed and waiting two or three years for a crop.

Be careful of the "crowns." If you cannot be sure you are getting good plants, that you can rely upon the dealer, do not make the purchase. It is very disappointing to give to a vegetable as much care as asparagus requires, and wait so long for returns, only to find that the plants were poor in the beginning.

Asparagus may be forced by putting three- or four-year-old roots in soil under the benches in the greenhouse or by placing them in hotbeds where the temperature is from 65 to 70 degrees Fahrenheit. The roots should undergo freezing for about three weeks before this is done, so that ordinarily they cannot be taken in before the latter part of December.

In growing bleached asparagus, the rows should be hilled up and the dirt kept above the tips until the tips are about eight or ten inches long. The plants should be set a few inches deeper than when planting for the green variety.

A mulch of well-rotted manure should be spread over the asparagus bed in the fall, covering the bed for about three inches in depth. This will prevent rapid freezing and thawing during the winter.

See that the manure is free from weeds, by placing it in a pan in the oven or furnace and thoroughly baking it. Work it into the soil in the spring.

"Crowns" should be planted early in the spring at a distance of about three feet in a trench.

Asparagus should not be cut until the third season and then only very lightly. Properly cared for, an asparagus bed will yield a supply for fifteen years, sometimes even longer.

The period for cutting asparagus should not be longer than six weeks. The usual practice is to stop cutting about July 1st. It should be fertilized immediately after cutting ceases. *The most successful growers believe in heavy fertilizing.*

Next year's yield of asparagus will depend upon this year's fertilization and cultivation.

When seeds are to be saved from asparagus, strong, vigorous plants should be selected and marked, and the seed should be gathered when it has turned a bright red. The seed should be carefully protected from insects during the winter.

Asparagus tops should be mowed off and burned when through cutting and not left to rot on the bed and harbor insects which will find their way to the roots.

Asparagus roots for spring planting should be dug in the fall and kept on a shelf in the cellar until spring. They should not be kept in a warm place or they may sprout too early. They should be planted out as soon as the spring days have arrived. In localities where the climate is mild enough they can be left in the open in a well-drained spot, or tied up in bundles of from fifty to one hundred and buried in moist sand.

Liquid manure is excellent for asparagus beds during the growing season, as there will be no danger to the roots from applying it as there is in digging in solid fertilizer.

In selecting asparagus roots for planting, discard all those which have very fine roots and many small shoots. Coarse roots and shoots denote strong plants.

One hundred and fifty square feet of land will be large enough *to supply the average family with*

asparagus, and this amount of space will require one hundred roots to plant it. An asparagus bed is a permanent investment and the plot should be planned with a view to keeping it in one location.

When asparagus shoots become stringy, stop cutting the crowns and let the shoots go to seed. All dead tops should be removed in the fall and fertilizer should be applied between the rows.

When growing asparagus from seed, sow the seed either in the spring or fall and tend the plants carefully. Transplant when two years old.

BALM

Balm seed should be sown thinly in rich earth, and the soil should be packed down firmly after the seed are in. Seed should be sown in the spring at the spot where the plants are to grow from year to year, as they will be self-perpetuating once they have gotten a good start.

A liberal amount of water is necessary for balm if it is to grow luxuriantly, though it will thrive in somewhat dry soil. The plant grows to a height of about twenty inches.

BASIL

Sweet basil seed should be sown broadcast in the garden in the early spring, after the ground has been warmed and all danger of frost is over. If early plants are desired, it may be sown in the hotbed or indoors during March or April and successfully transplanted to the open a month later.

Basil has much the same taste as cloves and is often substituted for them. If potted and kept in a warm sunny spot, it will *yield throughout the winter.*

BEANS

Beans thrive best in a rather warm, sandy loam, but are not difficult to raise on almost any kind of soil. The soil should not be too rich in nitrogenous matter or there will be an overabundance of foliage and stems and a yield of poor seed pods. Heavy clay is not well adapted to growing beans, as it bakes easily and prevents the seeds from germinating properly.

Beans will not survive frost, and early beans are often lost for this reason. Two or three plantings, five or six days apart, will insure an early supply, for

if the first and second crops are killed, the third will come through usually after the last frost.

The bean is a most suitable vegetable for rotating with other crops, as it does not draw heavily upon the soil.

Frequent shallow stirring of the soil should be given in growing *beans*, and other than this they will require little care.

For a constant supply of beans, sow a succession of crops. Planting later than six to eight weeks before frost will not be likely to yield satisfactory results.

Bunch beans should be planted in rows from two to three feet apart, and the plants should stand singly three or four inches apart.

Beans may be planted among corn, as they do not demand much fertilization and the corn will not suffer from a lack of it, though it is better to put in brush or poles for climbing beans that they may get plenty of sunlight.

Beans should never be hoed or cultivated while the vines are wet. To do so will cause rust to gather on the beans and they will rapidly deteriorate in quality.

An old-fashioned rule for the planting of beans is to "wait until the oak leaves are as large as squirrels' ears." And this rule can be used almost anywhere, as oak trees grow in almost all sections of the country.

Lima beans can be started early in dirt bands or small paper cups and transplanted as soon as danger of frost is over. By this method a very early crop can be had.

In selecting seed, remember that the old "*string bean*" is now obsolete in its relation to the garden bean. The McCasland bean is a *stringless bean*, but many seedsmen do not carry it. Ask for it and the demand will probably bring forth a supply. It grows eight and nine inches in length, is easily prepared, and has a delicious flavor.

When selecting beans for seed, choose the pods that have the shape which you wish the next crop to have, and those which are quite full of beans. Allow these seed beans to stay on the vines until they have become tough and the pods are almost like leather. Then cut the vines and let the pods dry on them before picking.

Dead stumps and bushes make an excellent support for beans, peas, and other climbing vines. Cucum-

bers, too, can be trained on these natural supports, and the heavier fruit will find a welcome resting place on the top of the stump if the vines are trained in such position that the fruit can rest without straining on the vine.

An old umbrella with the cover torn away will serve very well indeed as a trellis for beans, peas, etc., to climb on. Some distinction like this will aid *in marking the vines which are to produce seed.*

When procuring stakes for bean vines, pea vines, etc., if possible select cedar wood. It may be used for years and years if stored away carefully when not in use.

If the tops are pinched off the bean vines, there will be a great increase in the branches, resulting in more beans. When vines are so treated, they should be liberally fertilized and cultivated, for the vines have more nourishment to supply. This method also results in stronger vines.

BEETS

A rich, sandy loam is the best soil for beets, but they are not difficult to grow in any good soil.

Only well-rotted manure, or compost, should be used for beets. Fresh manure will force the growth of the tops at the expense of the roots.

Early beets can be raised by transplanting plants raised in the hotbed, or even in a box in the house. The transplanting must be most carefully done in order that the main root will not be broken, or branched roots will result and the beet not only will be knotty in shape but there will be waste in preparing them for the table.

There are four distinct types of beets: The ordinary garden beet; the leaf beet, or Swiss chard; the sugar beet; and the mangel, or stock beet. The leaf beet and garden beet are the ones for the home gardener to grow.

Beets should be planted in drills from a foot to a foot and a half apart, and when they have grown several leaves, they should be thinned to only three or four to a foot. *Seed should be sown* in the spring *as soon as all danger of frost is over.*

Beets usually come up very thickly because each seed ball contains several seed, so the amateur

gardener should sow very sparsely. Seed should be planted to a *depth* of an inch.

For a succession of beets during the summer, plantings should be made every four or five weeks during the spring. Beets to be stored for the winter should be sown late in the summer. *For winter use*, sugar beets will give satisfaction.

The thinnings of beets make good vegetable greens and should be cooked as spinach is cooked. No part of the beet should be wasted since the tops are so utilized. They are a most healthful vegetable containing properties which the human system needs.

Beets may be grown between the wide rows of such vegetables as *tomatoes, corn, melons, etc.* This will not harm the other vegetables, as the beet does not draw heavily enough to eat up too much food when planted in wide rows. The combination of a quick-growing and a slow-growing plant is seldom harmful to either.

Beets, carrots, parsnips, and turnips produce seed only from the second year's growth. Hence it is wiser to buy these seed than to attempt to save them from plants.

BORAGE

Borage is worthy of more extensive cultivation than it receives. *It will thrive in almost any soil,* but prefers a light, sandy loam. The seed should be sown where the plants are to stand during the month of May and thinned to a distance of a foot apart.

Only the very *young and tender leaves of the borage plant should be used.* Old leaves are strong and unpleasant to the taste.

BRUSSELS SPROUTS

The last of February or the first of March is *the time for sowing Brussels sprouts,* and they should not be transplanted until April, and only then if the ground has been warmed from the sun, or they will not bear transplanting well. For a late supply, sow the seed in April.

Brussels sprouts require a very rich, friable soil, and cultivation should extend for several inches in depth. The seed should be sown in drills to a depth of from one half to one inch, and the young plants should be thinned to a distance of eight or ten inches.

The location for the Brussels sprouts bed should be sunny and protected from cold winds. When the young plants begin to push their way through the earth's surface, a thin covering of straw or litter should be spread over them.

In mild climates, Brussels sprouts may remain in the ground all winter, but in the cold climate of the Northern States great care should be used in storing them.

CABBAGE

Cabbage requires a rich, warm soil if it is to mature early. For cabbages to be cut late in the season the soil should be heavier and more retentive of moisture than for early crops.

The cabbage worm which infests cabbage and cauliflower can be eliminated by a solution of one ounce of saltpeter dissolved in three gallons of water. One spraying will nearly always be enough, at least until another crop of worms have a chance to gather, and the saltpeter will not turn the cauliflower heads dark.

For early spring cabbage in the South sow the seed in December in the hotbed and transplant to

the garden the early part of January. *In the North the seed may be planted in the open ground in May or June*, but to insure an earlier crop, plant the seed in the hotbed in February and set out in the garden as soon as all danger of frost is over.

Cabbage rows should be from two to three feet apart, and the plants should be set from one to two feet.

As soon as the head is formed, cabbage should be used. It will keep well in winter, and freezing once will do it no harm, but it must be carefully stored in a cool place during the hot weather, or it will rapidly decompose.

Shallow cultivations given very frequently are better for cabbage than a deep cultivation once in a while. In fact, it cannot be cultivated too often, and it should be continued as long as the leaves allow passage between the rows.

Only in dry, hot weather does cabbage need to be watered when being transplanted, but the earth should be pressed down firmly about the roots and the soil should be fine and moist. Transplanting after a light shower, in the cool of the late afternoon, is the best time.

When cabbage heads show signs of bursting, pull on each head a little to break a few of the young roots. This will check the growth and usually stop the trouble.

All burst heads of cabbage may be utilized by making them into sauerkraut. Cabbage heads up very quickly when it once has a good growing start and burst heads should be carefully looked after.

If one can stand the heat, the middle of the day is the *best time to cultivate cabbage*, as the leaves are less brittle then than at any other time and will not break off so readily.

Burying heads of cabbage is the safest way of keeping them, for in this way, better than any other, *they will retain their crispness and brightness*, but when only a few are to be stored, they may be wrapped in newspapers and laid on the shelf, not the floor, in the cellar. They should be kept in a cool place.

Another good way of storing a small supply of cabbage is to pile a layer on a shelf, heads turned up, then place on them a layer of straw, and another layer of cabbage, etc. *In the South, they*

may be "pitted." This means digging a hole in the ground large enough for the supply to be stored and stacking alternate layers of cabbage and straw, and last of all placing a layer of earth several inches thick over the pit.

To keep worms off cabbage, the following method is recommended: Put two ounces of saltpeter in a ten-quart bucket of water and, with an old whisk-broom, souse each plant. The white butterfly, which lays eggs on cabbage, lights out quickly and does not infest when plants are so treated. Also, worms die quickly, and as saltpeter is a nitrate it stimulates the growth of the plant so that a *more uniform cabbage* will be the result.

Cabbage is ninety-eight per cent. water.

CANTALOUPES

Cantaloupes require a rich soil and compost is the best fertilizer to apply. A warm sunny location is conducive to early and fine fruits. *The seed should be sown in May* after the soil has become well warmed from the sun's rays.

The flavor of cantaloupes of the same seed will vary with the soil conditions and only by experiment can

one determine just which fruit will have the most delicious flavor under certain soil conditions.

Cantaloupes had best be planted in raised hills, about a dozen seed to the hill, not too close together. The seed should not be covered more than three fourths of an inch. *The seed should be soaked for a few hours in tepid water* before planting, in order to hasten germination.

Cantaloupes picked several days before they are to be eaten should be picked just before they begin to turn yellow. This applies only to the early varieties. Those ripening the latter part of the summer should not be picked until they are fully grown and the skins well netted.

Unlike most seeds, the cantaloupe seed is better if old. The older the seed, the better the melon, but it will have fewer seed in it. Many gardeners prefer seed ten years old in order to grow fruit with an abundance of meat.

In raising cantaloupes for seed, only the finest melons should be selected and these should be allowed to become thoroughly ripe before the seed are picked. Immediately after opening the melon the seed should be placed in a warm sunny spot to

dry out, and should then be stored away in a glass jar where mice cannot get at them, or you may find when the time comes to plant that most of them have been nibbled.

CARROTS

Carrots will grow in almost any soil, but thrive best in a moderately rich soil. They are not thinned very much, being allowed to grow almost as thickly as planted, though the seed are sown more thinly than other seed of the same size. *Seed should be sown one half inch deep.*

Weeds should be carefully kept down around carrots, for carrots require all the strength of the soil, since they are grown so thick.

Carrots should be dug earlier than the more hardy root crops. They can be stored in a cave, cellar, or any cool, well-ventilated place. If they are *buried in the sand in the cellar they will retain all their sweetness.*

When carrots are withered at the top and the roots have spots of the appearance of iron mould, the chances are that the carrot fly has been at them. Wood ashes will be very effective in getting rid of

this pest and should be well worked into the surface soil. A quart of paraffin mixed with a half bushel of wood ashes and applied as a surface dressing has been known to give excellent results. This makes the surface of the soil hard and the flies cannot penetrate it to lay eggs.

CATNIP

Catnip is sometimes used as a seasoning, but the real reason why one should have a bunch of catnip in the garden is for our friends, the cats. *It is the cat's true medicine* as well as a delightful relish, and when there is any around, the cats will find it.

Catnip should be sown in a trench an inch deep and the young plants thinned to eight inches apart. *It is self-perpetuating* and need not be renewed more often than every four or five years.

Catnip has a very pleasant odor for the adult; it is excellent as a tea for certain ailments; and as a tonic and a pleasure to the cat it has no equal. If it *once has a start, the roots will sprout every season.*

CAULIFLOWER

Cauliflower requires a rich, moist soil, and thrives best under irrigation. It will not withstand as much frost as cabbage.

If cauliflower and cabbage plants are not growing vigorously, push them with an application of nitrate of soda or pulverized poultry manure worked in along the rows.

Cauliflower and Brussels sprouts may be kept for some time if wrapped in paper, without bruising. Brown paper bags are best and when handled carefully these vegetables may be kept for Thanksgiving, and sometimes, under favorable weather conditions, even until Christmas.

The leaves should be tied together over the cauliflower head in order to exclude the light and *keep the cauliflower a snowy white.*

Cauliflower should be carefully watched, for little green worms which appear on the plant and eat the blossom. They are difficult to discern because of their color, but one worm can do an immense amount of damage to a head of cauliflower.

The cauliflower should be protected from the rays of the hot sun. If this is not done by tying the

leaves over the head, some sort of covering or other protection should be furnished. The hot sun will destroy the moisture so necessary for the rapid growth of the plant, and will give the head an ugly brown color.

In transplanting cauliflower, set the plants out in the cool of the late afternoon and pour water into the hole before the roots are placed therein.

CELERIAC

Celeriac is a large-rooted form of celery used for cooking purposes. It is very hardy and will grow well in almost any garden soil. It has much the same nature as celery, but it does not require banking or blanching. If the roots remain covered, celeriac may remain in the ground until it is ready to be used.

Celeriac seed should be sown in March in fairly rich soil and the soil kept at a moderately warm temperature. The seed should be firmly pressed into the ground by means of a board.

Celeriac thrives best if the young seedlings are transplanted to small pots to attain a growth of two or three inches before being set in a permanent loca-

tion. The ground should be kept well cultivated after they have been set out for the last time, and the soil should be gradually raked away from the bulbs until the latter are almost on the surface of the earth.

Plenty of moisture is required for celeriac plants, and the plants should stand at least a foot apart. The ground should be firm and should be well packed down before the plants are set in it.

Before frost, celeriac roots should be taken up and stored away covered with earth and straw. They may be left in the soil, if desired, but the roots should be well covered with earth, a layer of straw, and another layer of earth. They must be taken up in February, however, when this is done, or they will begin to sprout again and will rapidly become unfit for use.

CELERY

A moist, loamy soil is necessary to grow celery in abundance, and plenty of humus mixed in will give most satisfaction. If the water table is only a few feet from the surface of the earth it will be little trouble, otherwise plenty of watering must be

given. A good fertilizer for celery is composed of 5% nitrogen, 8% muriate of potash, and 6% phosphoric acid.

Stable manure is excellent for celery, but it should be well rotted before applying.

Celery seeds are small and slow to germinate. If soaked in warm, not hot, water for several hours before planting it will hasten germination. When seeds germinate too slowly they are likely to rot by the time germination starts. The temperature of the seed bed should be kept very low.

Celery seed should be covered to a depth of about an eighth of an inch. The bed should not be permitted to dry out, but care must be taken not to wash up the fine seed.

Celery plants are generally improved by transplanting twice, and bright days and cool nights are the delight of the celery grower.

From the middle to the latter part of August is *the time to blanch the celery* which has had a fairly early start.

Celery bleachers may be purchased for a couple of cents each if purchased in lots of one hundred or

more, and they will absolutely insure the celery bleaching to a clean, clear white.

A new method of celery blanching is to permit the plants to blanch themselves by setting them very close together. There must be a great abundance of humus in the soil, and of plant food and moisture, otherwise the plants will be stunted from slow growth. *A canvas covering also will be very satisfactory* in blanching, but it must be taken off on warm nights, and it must be at a sufficient height from the plant to permit plenty of air.

Blanching celery with earth makes it crisper and gives it a better flavor than blanching it with boards. The earth should be banked around the plants after first tying together the outer branches in a way to protect the inside ones. Paper and drain tile are also used in blanching celery, and unless the earth is fairly dry when piled around the plants, it is better to use them, as earth that is too wet when applied to the foliage may cause decay. Celery needs carefully handling.

If the soil in which celery grows is not properly drained, the plants are likely to damp off. It should be kept moist but not water-soaked. In watering, do not wet the foliage.

In transplanting celery in hot July for a late crop, the tops and long roots should be clipped.

Bordeaux mixture should be used on celery when it is necessary to spray, but it should be used early and before the celery is tied up for blanching. It can then be washed off by rain or from the waterings given and the tender buds will not be affected.

Celery must not be allowed to become checked in growth. A rapid growth will make it crisp and tender and tough celery is worse than none. Also checking the growth will cause the plants to run to seed.

Early trenching of celery is not conducive to long keeping, but where a large amount is to be stored it is necessary to begin trenching early in November.

Celery roots feed near the surface and *cultivation* must necessarily be shallow, or the tender roots will be injured. Cultivation, however, must be frequent.

Late celery crops should be provided by transplanting from the seed bed the latter part of June. This will furnish a supply very late in the season.

To preserve celery during the cold months, procure a stone jar and cover the bottom with a couple of inches of coarse salt. Stick the celery stalks in this and add more salt until the jar is full. The celery stalks should be just far enough apart that they will not be crowded and that the salt may surround each one. The salt may be used for ordinary purposes when the celery is taken out, and the celery will keep fresh and crisp for many weeks. The jar should be set in a cool, dry place.

To preserve celery out of doors during the winter bank the roots and stalks well with earth and cover the tops with five or six inches of straw or hay. Celery will stand light frosts but it must not freeze.

CHARD

Swiss chard is not difficult to grow, yet it is not in common use. The *soil* should be moderately rich, and it should be watered frequently in order to promote rapid growth.

Swiss chard should be started under glass and set in the open ground after the soil has become somewhat warmed by the sun.

Swiss chard should not be allowed to grow very large before using. The leaves make an excellent green cooked as spinach is and the center stalk is excellent when prepared like asparagus. A good salad can be made from the center stalks, as well.

Cut Swiss chard back to within two or three inches of the ground at each cutting. Only in this way will it be kept from growing tough and hard. *The thinnings* of Swiss chard make good greens.

CHERVIL

Chervil seed should be sown in the early autumn, but they will not germinate until the following spring. It will thrive on any garden soil. It is a very useful vegetable, as the roots can be used as carrots are used and the leaves will garnish as nicely as parsley.

Chervil requires only a moderately rich soil, but if it is given rich, friable loam it will be well worth the trouble. The seed should be sown in drills in their permanent location and the seedlings thinned to a distance of six or seven inches apart.

In the South chervil seed may be sown in September in the open ground. In colder climates, when early plants are required, the seed should be sown in boxes indoors, or in dirt bands when a large number of plants are not required. The less root disturbance, the better.

CHICORY

A deep, rich loam is required for chicory, without much clay or sand. It will not thrive unless the soil is right. Where it can be raised it is well worth the trouble to have the leaves to serve as a vegetable.

The root of chicory is the common adulterant of coffee. In some localities it grows wild and is regarded as a weed. However, this is rare, and more often it is carefully nurtured. When deeply enriched and carefully cultivated it will form solid heads which are often known in the markets as *witloof*.

Chicory seed should be sown the latter part of April or during the month of May. The young plants should be thinned to a distance of six to eight inches apart. In the fall, before frost, the

roots should be taken up and packed in boxes and blanched in a dark room.

CHIVES

No garden should be without its bunches of chives. As a flavoring for soups there is no superior, and when it is once started it is very easy to grow. As an edging for the flower bed it is most attractive, not only the leaves being a pretty addition but the flowers which come in the late spring are also very pretty.

Chives are best propagated by dividing the small bulbs. The plant rarely goes to seed, and saving seed is quite a difficult task. Almost any soil will grow chives, but a fairly rich soil containing plenty of nitrogen will produce wonderful results in leaves. If the bulbs are left in the ground over winter, they will sprout in the spring, but they had better be taken up in the fall and stored in a dry place in the cellar.

CITRON

Citron is cultivated much the same as watermelon, and a few of the fruit will go a long way, hence only one or two vines will be all that is needed by the average family.

COLLARDS

The soil for collards should be finely prepared, as, indeed, it should be for any diminutive seed. *The seed should be sown in trenches* about an inch deep and ten inches apart. The time to sow the seed is from June to August, and successive sowings will result in collards very late into the season.

If the leaves of collards are tied up when they are from four to six inches long, the inside leaves *will be beautifully blanched* and they will have a far more delicate flavor than unblanched leaves. It has a much sweeter taste than the cabbage.

Collard plants are benefited by being transplanted, and this should be done as soon as the first two leaves are strong and healthy looking. The new ground to which they are being transferred should have been prepared a month or six weeks before transplanting is done.

Collards require a liberal supply of water at all stages of their growth, but particularly after transplanting should the ground be kept wet. This wet condition should extend over at least four days until the roots have taken firm hold in their new surroundings.

Collards should be cultivated continuously day by day. Unless the ground is kept thoroughly broken up the growth will be very slow and the result will be tough, strong tasting greens. Particularly when blanching, should there be plenty of moisture and very frequent cultivation.

CORN

Sweet corn should be planted in rich soil and should have thorough and frequent cultivation. Four feet apart both ways is about the proper distance in order that the roots may be well nourished.

Sugar corn should not be planted near field corn if any of it is to be saved for *seed.* The wind and the bees will carry pollen from one to the other, and the result after the next year's planting will be a great disappointment.

Corn should be covered to about two inches when planting the seed, and it should be planted in the open ground as soon as the soil is warm in the spring.

Corn should be planted six grains in a hill and after it has grown to three or four inches in height thin out to three stalks. All weeds and suckers

should be carefully removed and burned. In a warm climate succession of crops may be sown every two weeks until the middle of July.

There is no such thing as too much corn. If you have the space, do not be stingy with your planting. Almost every living animal eats corn.

Well-drained land, preferably a slope, with a sunny exposure, will produce a crop much earlier than soil that is not favorable to the corn. Corn planted in cold, wet ground is likely to rot before sprouting.

Corn retains its sweetness best when put to cook in cold water, with the tender husks left on, and left in four minutes after the water boils.

Corn smut may be prevented by spraying with a solution of one pint of formaldehyde (or formalin) to forty gallons of water.

If the green is out of the cornstalks *the food value is partly lost. Seed corn* should be selected at cutting time, and the ears for seed should be placed in a separate basket in order not to get them mixed.

The corn should be cultivated frequently until the tassel is out, but to a very shallow depth along toward the last. Two inches in quite deep enough. In cultivating with horses, put the muzzle on and they will work better and the corn will be far safer.

Green corn can be hurried along somewhat by cutting the tops of the stalks off just above the ears. This will throw all the strength of the plant into the ears, and fine, large, full ears will be the result.

The job of cutting corn will not be hard if the knife is sharp.

In shocking corn, stack all on the center hill of a group of nine. Not nearly so many trips will have to be made in doing this as in other ways of stacking it up. Put your best self into the work. If a shock is not well set up, it will probably blow down during the first strong wind.

If the roots of cornstalks in the garden are uprooted and placed in a pile so that they will be washed by the rains, they can later on *readily be burned* with the addition of a little brushwood.

Choose all seed corn carefully. A great deal depends upon the seed. Be sure that your seed

dealer is reliable, above all things. There are many varieties of corn and a number of very good ones. The Golden Bantam probably is one of the sweetest and best for the table, though the ears are small.

Sweet corn intended for seed should be gathered before heavy frosts. As soon as the kernels begin to harden the ears can be gathered, slip-shucked, part of the husk turned back, and the ears tied together in pairs, and hung on a wire in a cool, dry place. In damp weather there is danger of mold if the ears are crowded closely together.

Tarring corn: In coating seed corn with coal-tar as a protection against crows and blackbirds, put the grain into a pail and pour on enough warm water to cover it. Add a teaspoonful of tar to a peck and stir well. Throw the corn out on a sieve or in a basket to drain, and then stir in a few handfuls of land-plaster (gypsum). Never pour the tar on the dry seed.

Seed corn should be thoroughly tested before planting. A shallow box filled with soil and divided into little squares will serve to test it. On each square place three grains of corn from different parts of the same ear. Test it miscel-

laneously throughout the lot if a large amount is to be planted. If only a small patch is to be grown it is well to test every ear. Number the ears to correspond with the hills planted. Cover the corn with a clean cloth, and over this spread soil about half an inch thick and press it down firmly to exclude the air. Place another cloth on this and sprinkle with water. Keep it in a warm place where it will receive plenty of sunlight, and in a week or so the seed from the good ears will have sprouted sufficiently to satisfy you as to the best ears.

In picking corn, carry a bag slung over the shoulder, and both hands will be free for work. No matter then how the rows run, the work will be simple.

Early picked seed corn should be dried out at once. If it is left in a pile for even a few hours the growth of mold is apt to start, and when it once starts it spreads rapidly and several bushels of corn may be lost in a very short while.

Ears of seed corn should be kept separate if possible. To hang it up after having tied several ears to a string, one not touching another, is the best

method of drying it, as in laying it on a board mold is apt to form on the kernels which touch the board.

Corn for seed purposes should not be planted nearer than a quarter of a mile to corn of other varieties, owing to the readiness with which it receives cross-pollination by the wind. *Crossed varieties of corn do not produce as fine seed.*

When planting corn with the corn planter, first soak the seed in hot water for a few minutes and then stir into the water a teaspoonful of tar to each quart of corn. Next pour it into a colander to drain and shake over the corn some dry, dusty sand.

In selecting seed corn: The ears on which the silk ripens earliest will produce early results. The kernels should be shriveled before the stalks are cut, when they should be dried in the open air.

The ears of corn which have the smallest cobs should be selected for *seed corn*, as the crop produced from the seed will be likely to resemble the parent seed.

CORN SALAD

The seed of corn salad should be sown in the fall and covered with straw during the winter. To sow the seed broadcast will give very satisfactory results. Prepared as spinach is prepared, it makes a very palatable dish.

A top dressing of *nitrate of soda applied to* the surface of the ground around *corn salad plants* will be very beneficial to the plants.

Corn salad has a very mild, delicate flavor, therefore, if it is *boiled with green mustard leaves* it is at its best.

CRESS

Do not fail to have a bed of water cress if there is a pool convenient. It is not only a pretty garnish, but it mixes well with other salads and gives a delicate and delicious flavor.

Cress, or peppergrass, should be sown in drills. It is not necessary to thin the young plants unless they are very badly crowded. If the seed are sown in the open ground after all danger of frost is over, the plant is ready for cutting in three or four weeks.

Cress should not be cut too close to the ground or only one cutting will be satisfactorily made. It is not palatable for salad after the flowers start, but it may be utilized by boiling and serving as spinach and other greens are served.

A sowing of upland cress once a week will be necessary if one would have a continuous supply of this very satisfactory little vegetable. A sufficient supply may be grown in a small brook and the plants may be started either from seed or from other plants.

CUCUMBERS

The soil for cucumbers should be rich, sandy, and somewhat moist, but not wet. The seed should be planted in hills about three feet apart each way, in order to give the vines a chance to spread. Aside from preparing a rich soil, an extra handful of manure well worked into each hill will insure rapid growth.

Cucumbers for a small garden can best be tended to if they are trained on a trellis or wire fence. The roots can easily be cultivated if this is done and without danger of cutting the vines.

They are easily trained to climb and the fruit is kept clean and fresh by this method.

When saving cucumber seed, select the first cucumbers that are of about the same size. Pinch off the vine at the second or third joint beyond the cucumber but not until after the cucumber has turned yellow, for not until then will the seed be ripe. The seed should be taken from the fruit and left to dry in the sun, then washed clean and dried again, when they will be ready for storing away.

Cucumber seed should be placed in a glass jar where the mice cannot reach them, but the jar should be left open, or dampness may cause them to mold.

To secure very early cucumbers, start in the hotbed, planting the seeds in dirt bands or small paper boxes which can be procured for the purpose. Even eggshells will answer. The young vines can be transplanted just as soon as the soil is warmed by the sun.

When planting in the open ground, sow five or six seed in each hill, and when two leaves have grown on the young plants, *thin to two vines to a hill.*

When cucumbers are started in the dirt bands and *grow too large while it is yet too cold to transplant,* check the growth by loosening the dirt a bit in the bands. This can be done by shaking them so that the roots will be somewhat loosened. Do not loosen the earth too much or the roots will not survive.

There is a small *beetle* which frequently attacks the cucumber at the lower part of the stem and the under side of the leaves. A piece of mosquito netting placed over the plants, held down at the corners by dirt, *will keep these pests off*, and yet the vines will not be injured.

Cucumbers should receive shallow cultivation, to a depth of about two inches, until the vines begin to run freely. After that very little cultivation is necessary except to pull out the weeds as they appear.

Cucumbers need frequent picking. They should not be permitted to mature seed until all that are desired have been picked. When once permitted to mature seed no more new cukes will be produced

DANDELIONS

Dandelions are excellent greens. They require little cultivation and are extremely beneficial to the human system in the spring of the year, acting as a tonic. Cooked with bacon and corn muffins they have no superior as a green vegetable. After they have grown old, they have not so much value nor is the flavor good.

Dandelions should be sown from March to June in drills about a foot and a half apart, covering the seed to a depth of half an inch. Thinned to twelve inches apart and given good, clean cultivation throughout the summer and covered with straw or manure during the winter, they will make quite as good "greens" the following spring as any other vegetable.

To blanch dandelions set two boards in the form of the letter V inverted over the row. Blanching makes the leaves tender and partly destroys the bitter taste. Boiled in two waters none of the bitterness will remain.

To blanch dandelion roots, take them up in November and store in sand until they are wanted for use. Place in a dark, warm place for several

days and watch carefully. Blanched roots are much more tender and delicate than roots left in the natural state.

EGGPLANT

The eggplant requires a warm, loamy soil and a long warm season to be grown to the best advantage. It is not extensively cultivated but when properly prepared is a most delicious dish.

Fresh stable manure should never be applied to eggplant. *The best commercial fertilizer* should contain potash 9%, nitrogen 4%, and phosphoric acid 5%.

Eggplant seed must not receive too much moisture when germinating, and the temperature should not fall very low. They do not require a great deal of moisture at any time after transplanting to the garden.

Eggplants should be set out in rows from two and a half to three feet apart, and each plant should have at least eighteen inches' space on each side. This will give plenty of room for *cultivation*, which they *should be given frequently while growing*.

A check in the growth of the eggplant may result in a total failure in fruit. The plants should be watched closely to protect them from insects and should not have other plants set among them to rob them of food. They need quite a good supply of fertilizer.

Eggplants can be grown to advantage in pots, and if the pot is a large one and only one plant to a pot a very high grade of fruit can be produced.

Eggplants should not be set in the garden until all *danger of frost* is over. It is usually not safe to transplant the young plants from hotbed to garden until the middle of May except in the far South, where everything has an earlier season.

The land on which eggplant is grown should not contain unfermented vegetable matter of any sort, and all *manure* should be thoroughly composted before it is applied to the soil.

Arsenate of lead will prove very effective *when getting rid of the potato beetle on the eggplant bushes.*

ENDIVE

For early summer use, plant endive seed in the spring, and for fall eating, plant in July. For winter use, endive may be taken from the garden and planted in boxes in a cold cellar. It will continue to produce leaves until mid-winter, and these leaves seldom will require blanching.

Endive requires a rich, moist soil and should be cultivated frequently and thoroughly in order that a good growth of leaves may be the result.

The seed of endive should be sown thinly and in drills a foot apart, and when the plants have a good growth they should be thinned so that they will not be closer than eight inches. For winter use, the seed should be sown in the middle of the summer, or later, and should be transplanted to the cellar or cold frame, with a bit of earth adhering to the roots.

Blanching endive requires care. It is done in two or three weeks usually. The leaves should not be tied up when wet or they will decay, and only the tip ends need be tied closely.

Endive should be blanched only as required for use. To leave the leaves tied up after they are blanched

will cause the heart to decay. Served with French dressing it is far superior to lettuce as a salad.

FENNEL

There are several varieties of fennel, all of which are used for seasoning. Sweet fennel is the most desirable perhaps for family use, as it can be served raw as a salad. *The seed should be sown in the early summer for a crop the following spring.* To have plenty of fennel the year round, sow in monthly succession and transfer a few plants to pots for winter use.

Florence fennel forms large bulbs which should be covered with earth when they are about the size of walnuts. In a couple of weeks they will have attained a good growth and will be perfectly blanched and ready to use. These *are good creamed* as celery is creamed, or even eaten raw as a salad.

GARLIC

When the garlic heads are well formed the bulbs should be gathered with long stems and woven into braids and hung up for drying. They will keep

indefinitely, and a few strands will last the average family a long while.

Garlic will remain in the ground from one year to the other if undisturbed. It should be planted in the early spring and cultivated much the same as the onion is cultivated, to which family it belongs.

Old compost which has been used for cucumbers will serve well *for placing over garlic bulbs.* The ground should be firm before the bulbs are set out, that the roots may take firm hold.

GOURDS

Gourd seed should be sown indoors or in the hotbed in April and transplanted to the garden the latter part of May or the first of June, depending upon the weather conditions. Too much sun is not desirable but they should not be set in a shady spot.

Compost is the best fertilizer for the gourd vines and plenty of moisture is essential for quick growth and large fruits. Given fertilization and water, they will require little or no other attention.

Gourds are very satisfactory as an edible fruit either baked or boiled, though they are not generally known as being at all appetizing. They are not good, however, unless eaten while very young and when they have grown and matured very quickly.

HERBS

Every garden should have an herb border. Indeed, if there is no garden, there should be a bed of herbs. Many of them are ornamental as well as useful, and the variety is large enough that all may have a choice. The following herbs are dealt with in this book and may be found by referring to the index:

Balm	Mint
Basil	Parsley
Borage	Rosemary
Catnip	Sage
Fennel	Savory
Lavender	Tarragon
Marjoram	Thyme

HORSERADISH

Horseradish grows best in a deep rich soil, where there is plenty of moisture. It requires little cul-

tivation except to keep down the weeds. Grated and mixed with a little salt and vinegar, it will keep a long time.

Horseradish is best raised by planting root cuttings five or six inches in length with the tops about three inches below the surface of the soil. The roots for planting should all be harvested from good, strong, healthy plants. At the end of the first season all laterals should be trimmed off, taking care not to leave a superfluous number remaining in the soil, or the horseradish will multiply until it is more bothersome than a weed.

The thick end of the horseradish should be placed upward in the ground. This will prevent water from accumulating on the end of the plants and causing it to rot. Horseradish plants should be set two feet apart each way.

Roots one year old will produce *the finest and most succulent horseradish.*

Soil for horseradish should be well fertilized. Nothing is quite so good as compost or even fresh manure.

KALE

The best soil for kale is a good, sandy loam, well supplied with humus, and thoroughly pulverized. The plants should be set about two feet apart each way, and the ground well cultivated.

The flavor of kale is greatly improved if it is left standing in the garden until after frost has fallen on it. When used as "greens" it makes an excellent substitute for cabbage.

Kale may be started in the hotbed or cold frame in February and transferred to the open ground when the sun's rays have allayed all danger of frost. The best size for transplanting is two or three inches in height. Plants for a late crop may be sown in the open ground in May, or even as late as June, but they should be transplanted also, as soon as they have reached a favorable size.

KOHL-RABI

Kohl-rabi should be cultivated as cabbage is cultivated, though it is really half cabbage and half turnip. The edible part consists of the swollen

stem of the plant, and it makes a very appetizing dish when properly prepared, though it has not yet grown to popular favor.

Kohl-rabi thrives best if planted in drills twelve inches apart where it is to grow. It will grow when transplanted but does not do its best. The young plants should be thinned early to a distance of a foot apart.

Kohl-rabi should be eaten while it is young and tender. When the plants have grown old, the roots are tough and woody, and contain little nourishment.

LAVENDER

Lavender will grow in a variety of soils, but the largest and best leaves are produced when grown in fairly rich, but rather dry, earth. The seed should be sown to a depth of an inch and the plants thinned to a foot apart. All root divisions should be made in the spring, while cuttings should be made by cutting a part of the main stem with the new growth. Cuttings and root division are *the most satisfactory ways of starting lavender,* as

growing it from seed is a slow process. Even root divisions are criticized by some gardeners as producing weak, spindly plants.

The spikes of the flowers of lavenders should be picked before they fade. The stalks should be tied together and turned back over the spikes and tied a second time to protect them. *Properly dried in a warm, dry room, lavender will keep a long, long time,* and the faint odor of lavender among bed linen is a most delightful treat for anyone, but particularly for the sick.

LEEKS

The leek is very hardy and under favorable soil conditions very easily grown. *A deep rich soil is essential* to the cultivation of this vegetable, and seed may be sown from the end of February to the end of March.

The seed of leek should be soaked overnight in cold water or for eight or ten hours in lukewarm water before sowing. They should be sown in trenches to a depth of a quarter of an inch, and the young seedlings should be thinned to a distance of fifteen inches apart each way.

As the plants of *leek* grow, earth should be thrown into the trenches, keeping the stems well covered *to blanch them.* The plants should be kept liberally watered, or the growth will be slow and the stems tough. They can be stored for future use in the same way that celery is stored.

LETTUCE

Lettuce attains its best development in a rich, sandy loam in which there is plenty of organic matter. If the leaves are to be tender and crisp the growth should be forced by watering frequently and not letting the hot sun fall upon it. The early morning sun is all that lettuce requires.

Leaf lettuce is earlier than head lettuce, it is much easier to grow, and has a more distinctive taste.

Lettuce may be sown in February in the hotbed or in the greenhouse and transplanted as soon as the ground is warm, or it may be sown where it is to remain, seeds thrown broadcast, and thinned when two leaves have grown. Transplanting, however, improves it.

The "head" variety of lettuce will not do well on

heavy soil. It thrives best on a somewhat sandy and well-drained ground, though it, too, must be kept moist. Heading lettuce is an art, and a little experience will do more than any amount of advice.

Break off the lettuce leaves as soon as they are large enough for use, leaving the stem on which to grow more leaves. In this way, lettuce will last many weeks, while cutting a head means no more lettuce from that root.

In thinning lettuce, do not throw away the superfluous plants. Served with a nice dressing, they will be almost as good as the larger leaves. *The "thinnings" also make delicious "greens"* if boiled with a little salt pork. They cook down to a very small amount, hence a considerable quantity should be used.

Fill some window boxes with rich earth, and sow lettuce seed in them, together with radish, mustard, small variety of beets, and small onion sets. These young plants will furnish fresh salad material throughout the winter months, and your guests will be as much surprised at the treat as they are pleased.

A succession of lettuce should be planted every season. Nothing gives more pleasure to the cook than to have a supply of lettuce on hand. A planting once every two weeks will furnish lettuce young and tender throughout the summer months.

Frame lettuce should be kept well ventilated. Lettuce requires plenty of air. The leaves are mostly water and will parch if not properly ventilated and water supplied to the young plants. Lettuce that is not started right seldom picks up as the weeks go on.

In the Southern States, lettuce seed may be sown during the autumn and the plants allowed to remain in the ground over winter. This will give a very early spring crop at a time when vegetables will be most appreciated.

Lettuce which grows rapidly without being checked possesses the best texture and flavor. While it should be kept moist, precaution should be taken not to allow the leaves to get wet. If the surface of the soil and the foliage are constantly wet, the plants will be *very susceptible to disease. Watering in furrows* is the best way to water.

In selecting lettuce heads with a view to saving seeds, choose those that do not show a tendency to

go to seed. These plants will attain a good growth, and the seed resulting will produce large, strong plants.

When lettuce heads have assumed a conical shape, they should be slit across the head with a sharp knife *to induce growth of the seed stalk.* It is sometimes well to remove some of the lower leaves when this is done to prevent the plant rotting from the ground upward.

When fuzz gathers on the *lettuce* heads, the *seeds are ripe* enough and should be cleaned and dried in the sun.

Lettuce, onions, peas, and beets should be planted very early. An early start will always be beneficial to them and they can stand a good deal in the way of change of temperature.

MARJORAM

Sweet Marjoram will grow in ordinary garden soil, and the seed should be sown in the spring in the place where the plants are to stand. They may be sown in the hotbed very early in the season, in February or March, and later be transplanted, but they do not bear transplanting as well as many other herbs.

Marjoram is easily propagated by root cuttings which should be taken in the spring. In cold climates, it should always be given a sunny exposure throughout the day, and should have some protection on the north and east.

MINT

Spearmint may be grown from seed, but it is more satisfactory to *propagate it by root cuttings.* The soil should be somewhat moist all the time. The quality of the soil is not important, for it will grow almost anywhere, but *a rich, friable soil will produce the finest plants.*

A bed of *spearmint* or *peppermint,* once started *is self-perpetuating.* A pot should be started for the house during the winter months, for use in making a sauce to serve with roast lamb, as seasoning, and various other things.

Mint may be preserved for winter use by picking the stems with the leaves and placing in a jar and vinegar poured over them. If preferred dried, hang to dry in a warm, dry room for a few days and then place in a glass jar and seal.

When mint for winter use is placed in pots, it should be planted, pot and mint, in the soil in the early spring. If this is done each year, the same plant can be used for a long time without renewing the roots.

MUSHROOMS

Before attempting to grow mushrooms, study the varieties thoroughly. There are so many varieties that are poisonous that it is not safe to take a chance. There are many inhabiting species which will spring up shortly after planting and which easily deceive the amateur grower, but they are not wholesome and many of them are deadly poison.

A cellar under an out-building is *an excellent place for the mushroom bed.* A bed about five by fifteen feet will furnish enough mushrooms for a family of six for several weeks. A second crop can be grown by merely sprinkling the bed after the first crop has been cut, putting on a thin layer of manure, well-rotted, and pressing it down firmly.

MUSKMELON

The muskmelon requires a long, warm season and a sandy loam for its best development. The soil

should be in the best of tilth and should be well fertilized, but not too heavily, with stable manure.

Muskmelon and cantaloupe may be planted either in hills or in trenches about six feet apart. The hills or trenches should be opened and filled with manure, well-rotted, and the soil replaced. The ground should then be leveled, leaving a low flat bed. Before planting fertilizer should be sprinkled liberally between the rows and worked into the soil. *The seed should be planted thickly*, and, when two leaves have grown, should be thinned to one, or at the most, two plants.

Muskmelons may be planted in dirt bands, or paper cups early, and transplanted after danger of frost is over by burying the bands, or cups, with the young plants. Do not loosen the earth when transplanting. The same soil should be used in the bands as is recommended for growing the vines out of doors.

If muskmelon and cantaloupe seed do not seem to germinate in good time, keep the soil well watered by running it in furrows parallel to the rows and four or five inches from them. By this method the water will soak through to the seed, but the

surface of the earth will remain dry. If the surface soil becomes wet it is likely to crust, when it should be raked in order to allow the young plants to push their way through to the light and air.

When saving muskmelons for seed, select the melons which have thickly netted skins. The vines should be pinched off at the second joint and the melon left to ripen in the sun before all the vine is removed. The seed should first be dried in the sun, then washed thoroughly and left to dry again before storing away. Mice are very eager for melon seeds of all kinds, hence they should be carefully stored away or you may find in the spring that the pulp has been eaten from all the fattest and best seeds.

Melons, cucumbers, squash, and Lima beans, are easily injured by frost and should always be covered with hay or straw when first set out, and this covering left on until all danger of frost is past.

Melons should be picked as soon as ripe, and never allowed to stay on the vines after they are ready to eat. They ripen just as well if picked green and taken into the house and kept until just a few days before time to eat, when they should

be put in the sun. To keep them cold and serve cold will tend to bring out their flavor.

MUSTARD

Mustard seed should be sown in drills and the young seedlings thinned to about a foot apart. Mustard grows to be very tall when going to seed, and when seeding has started the leaves have a strong, rank taste, and are not appetizing.

Green mustard leaves are used for making poultices and applied as the regular mustard plaster is applied. It is not so strong as the plaster made from ground seed, however, and must stay on the patient a longer time to take effect.

Almost any soil will produce mustard, and it requires little cultivation. The greens are cooked like spinach and when seasoned with salt pork are quite tasty. The white mustard with curly, fringed leaves is the kind usually used. It takes but a very short while to reach the state where it can be used.

OKRA

Okra is a dish little eaten in the North, though the South knows it quite well. It *does best on*

rather rich soil and requires frequent cultivation. Where the soil is suited to it, it grows to a height of six feet and produces an abundance of pods.

Okra seed should be soaked overnight in lukewarm water (set the vessel on the back of the coal range) before planting in trenches. The young plants should stand at least a foot and a half apart each way after they have attained a healthy growth. Seed should be sown as soon as all danger of frost is over.

The time to gather okra pods for frying, boiling, etc., is about ten days after the flowers have fallen. Old pods are woody and tough and decidedly unpalatable.

ONIONS

A rich, sandy loam with plenty of humus is best suited to the production of onions. They require shallow but frequent cultivation. Some onions may remain in the soil all winter without harm.

To hasten the maturity of the bulbs, the tops of the *onions* should be broken off. When the stubs of the tops are dead the bulbs should be removed from the soil to a dry, well-ventilated place to cure before storing away for the winter.

Ashes will prove very beneficial to onions if worked into the soil before starting the bed.

In the colder sections hardy onions will need mulching with old hay, straw, or manure after the ground is frozen. It will protect them from alternate freezing and thawing during the winter, and the plants will be in much better condition in the spring.

The sooner the onions for the early spring bunching are planted the better. The Egyptian is hardy throughout the North. In quality it is inferior to most other varieties, but it comes on early in the spring, and the bunched onions sell very readily in most markets.

Winter onions are a profitable crop in some localities. They can be planted any time from the last of July to the first of October. In the central section the last of August is a good time for planting; if on rich, well-prepared land and cultivated a time or two, they will make a fine growth by the time the ground freezes up. Severe freezing kills the tops but does not hurt the bulbs. The first breath of spring starts them growing, and they can be marketed in time to use the land for some other crop.

Onions should never be planted in the same place two years in succession, or the onion-maggot will cause trouble. Even if this pest does not trouble them, they will thrive better in a new spot.

Harvesting onions should begin as soon as most of the tops wither and fall over. Several rows should be thrown together and the onions should be left in the field for a few days in order that they may dry out before they are topped and stored.

There are several things about winter onions that recommend them to the grower: They are planted after most of the other crops are gone; they require very little cultivation; if the soil is in good condition, there will be little doubt about a successful crop; they have no diseases nor insect enemies; they are harvested before other crops; they can be allowed to mature and the bulbs be used for seed.

Formaldehyde solution, or formalin, should be *used on onions for insects and smut.* One pint of the solution to sixteen gallons of water is the proper proportion.

Onions from which seed are to be taken should have a small neck and be round in shape. Small onions are preferable to large ones, as the larger

sizes will usually produce seed that will increase the number of thick necks.

Onions which are to be grown for seed should be stored in a cool, dry place until planting time, when they should be set in rows about a foot apart. The sets should not be closer than four inches in the row, thus giving the roots every chance to grow and to produce fine specimens.

When the seed pods in a cluster of onions begin to burst and shell out, it is time to cut the seed. From six inches to a foot of the stalk should be cut with the seed, and *the seed should be dried in a shady spot.* To get rid of all the husk and skin, sift the seed through a fine sieve.

To segregate the good seed of onions from the poor, put the seed into a pail of water. The good seed will sink to the bottom of the pail. The seed should be thoroughly dried at once and stored away.

PARSLEY

Parsley requires a rich, moist soil in order to thrive.

Parsley seeds should be soaked in warm water for several hours before planting, otherwise the seeds will require a much longer period for germination, and some of them may not germinate at all.

Parsley will live out of doors all winter in the far South but cannot withstand the heat of summer if left where it receives the sun's rays all day. Hence it should be planted where it will get only the early morning sunlight during the hottest months.

A few plants of *parsley* set in pots or boxes and taken indoors *for the winter in the North* will insure garnish for meats all the year round. The same plants may be pruned back and set out doors again in the spring with good result.

Parsley may be started in the cellar in the autumn and it will be ready for use in a few weeks after the seeds are planted. The plants should be put near a window where they will receive the sunlight every day.

Parsley may be preserved during the winter by packing it in salt. A glass jar will serve for packing it, and there should be placed in the bottom a layer of salt half an inch in thickness, a layer of parsley two inches deep, another layer of salt, etc., until the jar is full.

Parsley should be thinned until there is only one plant to every six inches.

PARSNIPS

The soil for parsnips should be rich and deeply prepared, and the *plants should be frequently cultivated* during the season.

Seed should be sown as early as possible in the spring in the ground where they are to grow. They can best be grown to advantage in rows about twenty inches apart and only ten seeds to the foot should be sown. They should be covered for about an inch.

Parsnip roots should be ready for use in September and may remain in the ground and be taken up as needed. *Freezing in the ground improves the flavor.* The roots will not be good for a second season, however. They should be protected from heavy snows by a light mulch being placed over them.

When parsnips are left for the second year, the roots should be gathered early in the spring or they will send up seed shoots and will be unfit for eating.

PEAS

Garden peas require a rather rich and friable soil with good drainage and fertilizers that are high in nitrogenous matter and should not be mixed with the soil until just before planting, otherwise the vines will grow rapidly at the expense of the pods. Land manured the previous year will not need additional fertilizer.

When gathered young *the pods of sugar peas may be eaten* in the same manner as snap beans.

For the best results, peas should be planted in furrows six inches deep and the seeds covered with two or three inches of soil. After the plants are from four to six inches high the soil should be worked in around them until the trench is filled.

Peas will be easier to pick if trained on a three-foot poultry netting instead of using brush. This has the advantage, too, of lasting season after season.

The wrinkled varieties of peas are far superior in quality to the smooth varieties, though they have the disadvantage of requiring later planting than the smooth varieties because of the larger amount

of moisture which they need. They are not quite as hardy as the smooth varieties.

Peas are a legume and they leave the soil in fine condition for late crops of *potatoes, tomatoes, and cabbage.* Pea vines dug under will benefit the soil by making *humus.* The tender branches are excellent for the cow.

Hoeing or cultivating is the very life of peas.

Tobacco dust sifted on the pea vines while the dew is on them *will tend to keep off lice.*

The planting of peas should be at intervals of two weeks for several weeks after planting is started *in order to have peas for a long season.*

When selecting seed peas, choose the vines on which grow full pods. As soon as the first pods on the vine become somewhat tough pull the vines and allow the peas to dry on the vines. The peas should be a light green when they are dried out.

When seed peas are desired for a late crop, allow the pods to dry out thoroughly on the vine before cutting.

A wire fence on which to train the peas, beans, and other climbing vegetables will prove much cheaper in the long run than stakes or especially made trellises, not to mention the greater ease with which it can be erected each spring and taken down and stored away in the fall.

PEPPERS

Peppers should be sown in the hotbed in February and transplanted to the open ground as soon as the danger of frost is over. They require a rich soil, but will grow very well in almost any kind of soil.

Pruning peppers will produce a fine, large variety of fruit.

Peppers need only an average amount of moisture, but they *should be well watered when being transplanted.* Peppers have a long season and do not need to be planted but once each year.

Peppers are easily injured and should be gathered before *frost falls on them.*

POTATOES

From the middle to the last of June is the usual *time for planting potatoes in the North.*

A loose, rich, gravelly, or sandy loam is desirable for potatoes. Manure should be applied to the crop that precedes rather than to the potato crop itself. Hence, potatoes following other vegetables which have required much fertilizer will be a very successful method.

If potatoes are sprouted in the light before planting it will hasten their growth. The sprouts should be about one fourth to one half inch in length before they are planted.

Potatoes should be cultivated six or seven times a season, but care must be used not to let the hoe or fork scratch the young sprouts or they will fall off. The soil should be harrowed well before the plants appear above ground. Early harrowing kills millions of sprouting weeds and avoids much future work. The best kind of harrow to use is a spike-tooth implement, as there is practically no danger of harming the potato sprouts with it.

A well-prepared seed bed is firm and in good tilth. To have the bed well prepared beforehand will have an important bearing upon the quality and quantity of the crop, as well as save a great deal of work in cultivating.

Potatoes should never be planted twice in succession in the same spot. The substance required by them will be eaten up the first time and some other vegetable should come in between, preferably peas or beans, the tops of which should be plowed into the soil after the bearing season is over.

All seed potatoes should be treated for scab before planting. An approved method is as follows: Soak the whole seed for two hours in a mixture of one half pint of formalin or formaldehyde dissolved in sixteen gallons of water. Next, dry and cut the seed and plant at once.

Potatoes should be sprayed with Bordeaux-arsenate of lead mixture every ten days for two months after the plants are up. This will *prevent bugs infecting them*, while to wait until the bugs have started trouble, will mean a hard task getting rid of them, and perhaps they will get their mischief in before the task is accomplished.

When growing potatoes on irrigated land, the ground should be carefully leveled and should have a fall of nearly two feet to the hundred. There should be good drainage for all surplus water.

Late potatoes planted too early will be checked in growth during the summer and will not mature a full crop.

It does not pay to be too sparing of seed potatoes. Never split the eyes when short of seed. The stalks need better backing than that and should be given a substantial piece to start from.

To guard against dryness, plant in deep furrows, cover the seed lightly until the plants are several inches high, then cultivate and fill in until the ground is level. This will hold the moisture in the earth and prevent the potatoes drying out.

A sharp knife lightens the job of *cutting seed potatoes*, but to keep from injuring the thumb at the same time, *an old leather glove thumb* should be used.

One very effective way of getting rid of scab on potato seed is to dust the pieces of potatoes with sulphur.

It will be a good thing when people again *cook potatoes with their jackets on.* The part of the tuber next to the skin is the most nutritious and has a far more delicious flavor than that nearer the center, and there is absolutely no waste to the

potato when cooked in this way. They require only twenty minutes for boiling.

Potatoes should not be dug until they are mature unless you are willing to have quite a bit of waste. They should always be *dug on a dry day* and they will be clean and easily washed.

Dug potatoes will turn green if exposed to the sun too long, hence they should be stored away as soon as dug.

Spray the potatoes before the blight gets at them. It may not do any good when the blight once gets a start. Late potatoes will require careful cultivating and regular spraying throughout the month to keep down weeds, conserve the moisture, and head off blight and bugs.

Pits in which potatoes are to be stored should be looked over carefully in the fall of the year. All openings planned for ventilation should be closed and sufficient earth put on to protect from the severest cold. The pits should be well drained to keep the water from standing around them.

In digging potatoes for storage, wait until the vines are dead. Potatoes should be handled carefully in order that they may not become bruised,

and should be stored in a cool, shady place until time to store in the pit or cellar.

The seed end of potatoes is the end farthest from the stem. When the strong eyes are at the seed end, the potatoes should be split lengthwise that a bud of the seed end may be on the end of each piece.

Seed potatoes should be spread out in the sun for ten days before planting in order to start thick, short sprouts. Long, thin sprouts are not conducive to strong, healthy plants. Protection from frost should be given the potatoes at night.

POTATOES (SWEET)

Sweet potatoes need a warm, sandy loam and thrive best not farther North than Virginia. The last of May or the first of June is the *best time for planting.* Those started on a well-prepared ground in June usually start growing better and require less cultivation than those planted in May, as the ground has then been thoroughly warmed.

Sweet potatoes should be thoroughly dried out as soon as put into the pit. The ventilators should be kept open and the heating plant started and the temperature kept at one hundred degrees Fahren-

heit until they are thoroughly dried. Sweet potatoes always shrink from fifteen to twenty-five per cent., and this loss must be expected. They should be dug as soon as frost kills the tops, but if there are a great number to be dug, the work had best be begun ahead of frost, as it will not do to let them lay too long.

PUMPKINS

The pumpkin requires a fairly rich soil and good drainage. The seed should be planted in hills from five to seven feet apart and eight or ten seed to a hill. Planted among the corn, it will give good results. They should not be planted until all danger of frost is over.

Pumpkins should be picked with a couple of inches of the stem left on or the fruit may start to rot at the stem center. Bugs also find an easy entrance there. They can be kept for a long time in dry storage.

It is better to have all the fertilizer necessary in the soil for pumpkins before they are planted, and if it is necessary to fertilize later, the fertilizer should not touch the seed or the young roots.

Too much nitrogen will produce long vines and large leaves but poor fruit.

It has been generally thought that *pumpkins* will cross with *squashes, and melons with cucumbers,* but this has been proven not to be the case, in many experiments. Therefore, they may safely be planted within close area.

RADISHES

Radishes planted in a rich, moist soil will often mature in two to three weeks after planting. *The seed should be sown in drills* about a foot apart, and the plants should be thinned to prevent crowding, though one every two inches is not too thick.

In order to have fresh, crisp radishes throughout the season, sow seed every two weeks. If radishes remain in the ground too long, they will have a stale, flat taste, even if they do not grow pithy. Radishes may be grown throughout the winter in hotbeds, requiring little attention.

Sow both white and red radishes. They will make a pretty garnish for the table.

Radishes do not require extreme heat, hence they should be planted where they will get only the morning sun and a little of the early afternoon. This can usually be arranged by planning the bed in a location near a house or barn where sun will be shut off in the early afternoon.

RHUBARB

The soil for rhubarb can hardly be too rich. The quality of its food supply depends upon the quickness with which it grows. It is an early spring dish and should be young, tender, and brittle when cut. It should be sown rather deep when seed are used, but a most satisfactory way is to purchase a few roots. It is a perennial and when once started multiplies very rapidly. Autumn is the best time for setting out roots.

Old hills of rhubarb should be divided in the late fall by removing the earth on one side and cutting away a part of the root. This root can be planted then for next spring's sprouting, and it can also be kept safely in a dry place in the cellar. Heavy cuttings should not be made until the roots are at least three years old.

Very early rhubarb can be grown by putting a box, or a barrel with the top and bottom removed, over the plant during the latter part of the winter, banking fresh horse manure around the box, and partly filling it with manure. This will force the growth.

Rhubarb can be had during the winter by digging up the old roots, allowing them to freeze, and then planting them several inches deep in loose ground in the cellar, in a cool, dark place. It will take only from seven to ten weeks for nice, long stalks to be produced. Roots are of no further use after they have once been forced.

Rhubarb roots should not be planted closer than three feet, otherwise they will grow and overcrowd each other and dwarf the plants.

Rhubarb pods and seed stems should not be allowed to mature unless the plant is of no further use as a food producer. When the plant goes to seed there will be no further usefulness.

Rhubarb helps to put the system in good condition. No better tonic can be taken in the springtime. The acid of the plant counteracts the effect of the heavy diet of the past winter.

An excellent shortcake can be made with rhubarb. The cake should be baked just the same as it is baked for strawberry shortcake and then stewed rhubarb spread between each layer. This is excellent for the children, and if given them, they will require no liver tonics.

Look at rhubarb roots closely when purchasing and see that healthy stock is given you. Spindling, diseased roots can never be made to produce fine, big stalks. In growing rhubarb in large quantities, plant the roots in rows three feet apart and each root should have three feet of space between it and the next root.

Rhubarb should be mulched in the fall and enough manure applied to keep the roots warm all winter. To heap the manure up around the roots, first having cut off all stems remaining, leaving it there until fall when it should be well worked into the ground, will be pretty sure to produce early, tender rhubarb.

ROSEMARY

Rosemary requires a light, warm soil and protection from the cold. The seed should be sown in the spring in drills to about an inch in depth and

the young plants should be thinned to seven or eight inches apart.

Rosemary cuttings should be taken from the bush in the spring before growth starts or late in the summer. *When transplanting young plants,* the work should be done in the fall in the South or in the spring in the North. All plants and cuttings should be kept well watered for several days after the re-planting.

Rosemary bushes will grow more luxuriantly if they are pruned in the late winter or early spring. Properly cared for, the plants will live a number of years, and the older bushes will be much more hardy and give forth better leaves than younger plants.

RUTABAGA

The rutabaga requires a rich soil and plenty of room for the roots. It is cultivated a good deal like the turnip and makes a really excellent table vegetable, though not given the appreciation it deserves.

Rutabaga seed may be sown broadcast and the young plants thinned out when they have

attained a couple of inches' growth. The *seed may be started as soon as danger of frost is over.*

Equal parts of *rutabaga and white potatoes* mashed together *make a delicious dish.*

SAGE

Sage is a very hardy plant and will grow under almost any soil conditions. It is best propagated by cuttings, though it may be easily grown from seed. The root clumps should be divided every other year or they will grow matted and retard the growth of the leaves and stems.

The broad-leaved sage is the best variety both with regard to flavor and the ease with which it can be grown. The first year it should be cut only once, but successive years will produce three or four cuttings per season. It should always be cut before the flower stems appear.

SALSIFY

Salsify, or vegetable oyster plant, is deserving of more general cultivation. When boiled and coated with cracker crumbs and fried in butter it makes a most delicious dish. It *can be sown early in*

August for use the following spring, or sown in the spring for use late in the summer.

Salsify may be dug in the autumn and stored in the cellar until wanted, or it may remain in the ground during the winter. It should be treated much like the parsnip in cultivating.

Salsify is a biennial and if the roots are not dug before the second season they will sprout stems and produce seed. It is hardly worth while raising seed, however, as those purchased can usually be relied upon. It is of a weedy nature, and care should be taken that it does not run wild from seeding too freely.

Salsify grows best in a deep, well-enriched soil. If the soil is too heavy, or the manure is not thoroughly rotted, the roots will be straggly. The best salsify bed is one which has been enriched for some other vegetable, no other fertilizer being added except manure which should be buried about a foot deep.

Salsify roots may be left in the ground during the winter and only pulled up when required for use. They should all be taken up in the early spring before they begin to sprout new growth and should be stored either in sand or in straw and earth.

Salsify seed should be sown broadcast when the danger of frost is over and the plants should be thinned to a distance of six or eight inches when they have grown to be three or four inches high.

SAVORY

The soil for savory should be rich but not too heavy. Summer savory is an annual, but winter savory is a hardy perennial, and hence is the most satisfactory to grow. The seed of both kinds should be sown under glass in March or April and the young plants transferred to the open ground as soon as danger of frost is over.

Only the leaves and tips of *winter savory* should be used, and these should be picked off as wanted; *summer savory* may be cut while flowering and the whole plant used.

Cuttings and root divisions of winter savory should be made in the spring and they should be kept well watered until the roots are firmly established.

SEA-KALE

The soil for sea-kale should be rich and moist in order that the shoots may grow quickly. Lack

of nourishment will mean slow-growing plants which will be tough when eaten as well as lacking in delicacy. The ground should be deeply dug before planting kale, and cultivation should be thorough and regular.

Sea-kale may be raised from seed sown broadcast when the ground has been warmed. The seed should be sown in trenches a couple of inches deep and the trenches about fifteen inches apart.

Sea-kale may be sown in the open ground in March and the young plants transferred to their permanent quarters as soon as they have made six leaves. *Propagation by root cuttings is far more satisfactory,* however, than propagation from seed. The division of the roots also should be made in March.

Sea-kale should be cut when it is about six or eight inches long. Not less than half an inch of the old wood should be taken off at the same time.

Covering the crowns of sea-kale with ten or twelve inches of sand after the plants have died down will cause *the production of very good kale without resorting to forcing.* There should be absolutely no light permitted to reach the plant during the growing period.

SQUASH

The bush variety of squash should be planted in hills four or five feet apart each way, while ***the running variety*** should be given at least twelve feet in which to spread. Three or four hills or vines will be all that is needed for a small family.

Squashes should not be planted until the ground is thoroughly warmed, as they require a warm soil, and a rather rich one. They will grow, however, in almost any soil.

Only well-ripened squashes should be stored and they should be gathered before frost falls on them, as a frost of average severity will impair their keeping qualities. They should never be pulled from the vine but should be cut with a knife, leaving on about an inch of ***stem as a protection against bugs entering the fruit***, and a precaution against too much moisture starting the fruit to rot. They should be handled carefully to avoid bruising and should be stored in a moderately warm but well-ventilated room. A ***temperature*** of from fifty to sixty degrees Fahrenheit will be just about right.

The summer variety of squash will not be satisfactory for fall use, as they do not keep

well, and the skin grows hard, rendering them unpalatable. *Winter squashes can be used in the summer*, however.

When the necks of *squashes* are warty the fruit will be *dry and poor in quality.*

TARRAGON

Tarragon requires very little fertilization, but it likes plenty of sunlight. Very little moisture is required and only the ordinary amount of cultivation.

If the leaves and tips of tarragon are steeped in good, pure vinegar for twenty-four hours, it will make *a delicious tarragon vinegar for salads.* The peculiar flavor is very appetizing, and tarragon is well worth growing for the vinegar alone.

True tarragon seed is almost unheard of. It is best propagated by root cuttings or slips, though seed may be obtained of an inferior plant called Russian tarragon.

THYME

There are two varieties of thyme: mother-of-thyme and lemon thyme. Either will be very

pleasing when used as a seasoning. Seed should be sown in trenches an inch deep, or a division of the root may be made in the spring before growth has started.

Thyme requires plenty of sunlight and a light, dry soil. Given an occasional bit of cultivation to keep the weeds down, it will require little else. It is best, however, to renew it every two or three years and to give it a new location.

TOMATOES

Tomatoes are one of the most satisfactory of vegetables. They *will grow in almost any kind of soil* but thrive best in a fairly rich loam. They require plenty of sunlight in order to grow quickly.

To have an early crop of tomatoes start planting the seed in the North about the first of March; in the South, earlier than this. They may be planted in a hotbed or flat in the warm zone but should be kept in a greenhouse in a cold climate, until ready for transplanting.

Late tomatoes may be started the last of April, and generally the tomatoes from a late planting are superior to those planted earlier.

In order to have strong, stocky tomato plants, set them at least two feet apart, and even three feet will be better. Each fruit needs to have the sun's rays fall on it if it is to ripen thoroughly and properly while on the bush.

If the tomato plants do not seem to be growing vigorously, sprinkle fertilizer or chicken manure between the rows and work it in. The roots of the tomato will spread and reach out for the food.

Keep the frames in which tomatoes are planted uncovered whenever the weather will permit. The sooner the plants can resist cold the better for them. And do not forget that the *plants require cultivation while still in the frame.*

To transplant twice will insure more vigorous, healthy plants. The last planting, to the garden bed, should be done as soon as the weather will permit, *i. e.,* as soon as there is no longer danger of their being nipped by the frost.

Under favorable conditions the earliest varieties of *tomatoes require one hundred days from the time seed is sown until the first ripe fruit is produced.* The largest and best fruit will usually mature in about one hundred and thirty-five days.

Tomatoes either should be staked or kept off the ground by means of a frame. There is difference of opinion as to which is the best method, but the fruit should be kept off the ground in some manner or it will rot and attract *bugs*, and better colored and more even fruit will result from this method of protection.

When picking tomatoes for shipment, they should be taken from the bushes as soon as the first red tinge appears. Properly picked, and packed in such way that they will not bruise, they will arrive at their destination in almost as good form as if they were just taken from the bush.

Overripe tomatoes should be fed to the chickens. One tomato which has remained too long on the vine will draw flies and insects that eat into the sound tomatoes.

When tomato plants are injured by fly-beetles, spray with Bordeaux-arsenate of lead mixture as soon as the plants are set in the field. (Directions for making this spray are given elsewhere in this book.)

In case of a cold snap, the tomato plants can be protected by turning a furrow toward them on one side of the row, and then bending them over against

the ridge and covering them with about two inches of soil.

The best tomatoes will be produced from seed which have ripened on the plants early in the preceding season. There should be no defect on the tomato at the blossom end or the seed will be imperfect.

Tomatoes for seed should be allowed to stand after they are picked until they are thoroughly ripe, when they should be cut crosswise to expose the cells. The core should be as ripe and soft as the tomato pulp itself.

All green or nearly mature tomatoes should be picked just before frost, with stem attached, handled carefully to avoid bruising, and spread out upon the floor or on a shelf in the cellar, if it is dry enough, otherwise in the pantry. When ripened in this way they are quite delicious and if insects do not get at them they will keep for quite a long while.

Pruning and training tomatoes will insure a larger and better crop, as well as shorten the time of ripening. Plants that are pruned will produce ripe fruit ten days earlier than the same variety that is not pruned.

Those who have had no experience in pruning tomatoes might do well to wait until the vines blossom before trimming out the branches, when it can be seen where the thickest spots will be. The smaller and weaker branches should be thinned out, leaving the more vigorous ones.

Tall, top-heavy vines should be guarded against, or the fruit will sag to the ground.

The longer tomatoes can be cultivated without injuring the plants the better the yield and quality of the fruit. Shallow cultivation can be kept up until the ripening season is well advanced if the vines have been properly staked. This is especially important during a drought.

When especially large and fine fruit are desired, prune the tomato to one stem, usually the first main stem. All laterals, or side branches, and all suckers should be removed as soon as they start in order to save all the sustenance for the one stem.

Removing branches with the fingers is just as satisfactory in every way as cutting with a knife and there will not be the danger of the knife injuring some part of the branch which is not to be cut.

When a plant with two stems is desired, select the main stem as when growing to only one, and in addition retain the first lateral that appears on the axil of the leaf. The nearer the ground this lateral, the better. Two stakes should be used instead of one to support these two stems. The same method applies to three stems.

A wire trellis is excellent for training tomatoes and has the advantage of being useful for many, many seasons. *Hooks on which picture wire is hung can be utilized* by hanging them on the wire and drooping the vine over the lower curve.

Excess water around tomatoes will be likely to cause "damping off." Proper drainage should be prepared and spraying with Bordeaux mixture will nearly always correct the trouble. If it does not, all affected fruit should be burned. It may be wiser to burn the fruit before waiting to see what spraying does for the trouble.

One good way of drying tomato seed is to squeeze out the pulp and seed of the fruit and leave it in the hot sun for several days, when to it should be added enough water to cover. If the seed is stirred for a few minutes to rid it of pulp, it will sink to the bottom of the water. Next pour off

the water and wash the seed thoroughly and dry in the sun, turning the seed over until you are sure all are dried.

TURNIPS

Turnips require a rich soil and the seed should be sown in drills a foot apart as early in the spring as is safe, considering frost, when the roots will be ready for use before the weather is hot.

The seed bed for turnips should be very fine, preferably pulverized, then rolled. The best results will be obtained by *sowing the seed after a rain* and covering the seed very lightly with earth.

In sowing for late turnips, under favorable conditions the seed sown the first week in September will produce turnips of better quality than those sown in August. The safest method is to sow in August and again in September. The difficulty of sowing in August is lack of moisture to germinate the seed.

Turnips may be stored in the cellar *for use during the winter* or may be buried in a pit out of doors, but before they are stored all tops should be removed to safeguard against decay.

The tops of turnips make excellent "greens" and in some localities they are raised for the tops rather than the roots. They should be cooked as spinach is cooked, and the addition of a little salt pork when boiling adds greatly to the flavor. The water in which they are cooked makes very tasty soup stock.

Turnips are hardy and several frosts will not hurt them. They should not be allowed to scald, however, as this will cause them to rot.

Unless turnips are thinned at just the right time, they will be a disappointment. They should be thinned out just as soon as they have grown large enough to be able to see which are to be the hardy plants. If they are not thinned at the proper time the roots will be tough and stringy when mature.

VEGETABLE MARROW

Vegetable marrows require a moderately rich soil and frequent and thorough cultivation in order that they may grow quickly and be tender.

The vegetable marrow is closely allied to the pumpkin both as to species and habit of growth, the principal difference being that marrows are used while young and tender and may be baked

and served very much as the sweet potato. They *should be gathered while the outside skin is still so tender* that it may be easily broken by the finger nail.

The small varieties of vegetable marrow are far more palatable than the large varieties. Marrows should not be peeled before they are cooked. The very best plan is to grow the small variety and cook them whole.

Ordinarily *vegetable marrow seeds* are sown out of doors in May, but *to get an early start*, they may be sown in pots indoors in April. The pots should be set out of doors a little while each day to harden the plants before transplanting them.

WATERMELONS

The watermelon requires plenty of room as the vine grows to a great length. They should be planted ten feet apart one way by at least four feet the other. *The land should be quite rich* and should have quite a high percentage of sand.

Watermelons should not be grown in the same location year after year. A rotation of crops is

most advisable for this fruit if large, luscious melons are to be produced.

Watermelon seed should be sown in pots or in inverted sod indoors *in April or May* in order to produce early melons. In sowing out of doors, defer until June. The seed should be set in the ground with the eye down and about a dozen seeds planted in one hill.

Watch out for the cucumber beetle on the watermelon vines until the foliage is toughened. Spray with Bordeaux mixture.

Melons need a very abundant supply of moisture early in the season but produce fruit of the best quality if the soil is comparatively dry during the ripening season. Soil moisture can be conserved by frequent cultivation. This applies both to *watermelons and muskmelons.*

Watermelons which have the thinnest rinds and are of a deep green color will contain *seed which will produce the strongest vines and the reddest-meated fruit.* Watermelon seed do not have to be dried before washing as is the case with muskmelons and cucumbers.

SOIL AND FERTILIZATION

No one would attempt to go into the banking business without first learning something of the principles of banking; no one would apply for admittance to the bar without first fitting himself for pleading; and no one would go into the ship-building industry without a knowledge of the principles on which ships are built. Yet almost anyone feels himself competent to start a garden and grow vegetables without giving agriculture much thought. If he sticks a few plants in the soil and they chance to grow and flourish he thinks he has the gift of gardening. Well, gardening is a gift, but success does not depend so much upon a gift for gardening as it does upon a gift for detail and perseverance. Vegetables must be studied. Every plant is, on a smaller scale, deserving of as much attention as every individual. Plants vary widely in their requirements, and the condition of the soil is the first thing to be studied when planting the garden. Nitrogenous food,

which is so beneficial for plants grown for foliage, will not be profitable for plants which are grown for pods.

Nearly all the States in the Union have Agricultural Experiment Stations (a list of which may be found by referring to the index), and it is the business of those in charge of the Stations to analyze soil sent them by gardeners and to tell them what kind of fertilizer should be added to enrich the soil. A list of the vegetables desired to be grown should accompany the package of soil, that special attention may be given to the analysis with reference to the requirements for these particular vegetables. A somewhat sandy soil can be made productive of almost any vegetable by the addition of the necessary fertilizer, for the sand foundation will insure good drainage, and supplies more warmth than a heavier soil. Clay makes a very poor foundation for the garden plot. It does not drain readily nor does it warm up early in the season, and it is difficult to cultivate as it is hard when dry and soggy when wet.

Soil that has been very poor will be much improved if clover is planted on it for a couple of seasons and this clover, together with any other foliage, plowed under in the fall for the making of

humus. Humus will prevent clay soil from becoming soggy and hard and it will assist the sandy soil to hold moisture. Where the soil is too rich, or where it is soggy, lime applied very generously will have a neutralizing effect, but soil should be analyzed when an amateur is planning the planting before the risk is taken of making the soil poor and unproductive.

When supplying fertilizer in the form of manure, it is best always to apply it in the fall and plow it under for a depth of several inches. It will then be in a very decomposed and friable state for spring planting and there will be no danger of crops suffering from burning as is the case when fresh manure is applied. An acre of ground requires at least thirty-five tons of manure and an additional four to six tons will not be too generous a supply. Aside from the soil being in better condition by means of the manure having been applied several months before planting time, there is also the advantage in being able to plant much earlier than if it is necessary to wait for the frost to be out of the ground before harrowing and fertilizing. Plowing and fertilizing in the fall is particularly beneficial with reference to clay soils, as the snow penetrating the earth will have a good effect in breaking up the lumps.

After the soil has been tested and enriched in accordance with the vegetables to be grown, the garden should be carefully laid out with a view to choosing the best location for each particular plant. Some vegetables do not require very strong sunlight. Lettuce, for example, requires a great deal of moisture, as does asparagus, hence these vegetables should not be planted where the sun will constantly draw on the moisture or the result will be very slow growth and tough, stringy vegetables when mature.

And then, another very important feature in planting the garden is to arrange for a repetition of crops. On another page in this book will be found a table of successive plantings which has worked out successfully in instances personally known to the author.

Rotation of crops tends to produce a very excellent soil. The same kind of vegetables grown year after year in the same spot will in time take from the soil all the food which is needed by that particular plant-life, and will leave a surplus of plant-food of another kind which has not been needed by the vegetation grown there. Rotation also tends to destroy weeds, and insects do not infest a spot where different crops are planted each year.

For small gardens, the following *fertilizers* should be applied *one half ounce to the square yard:*

Sulphate of Ammonia	Nitrate of Soda
Sulphate of Magnesia	Nitrate of Potash
Kainite	Sulphate of iron

The following should be used *two ounces to the square yard:*

Bone
Dried Blood

Heavy soils that have been overfed will be benefited by the use of a dressing of *sulphate of lime*, applied in the fall. *Guano* is excellent for spring and summer use in the proportion of an ounce to the square yard or half an ounce to a gallon of water. Guano should be applied in the spring or summer.

The State Agricultural Experiment Station in the various States *will analyze soil* without charge, advising just what properties it lacks, and it can then be fertilized intelligently without waiting to find that the result of sowing is a poor crop.

Where the soil is healthy, i. e., free from insects, *grass* and other vegetation *may be plowed* or spaded up and turned under *to form humus.*

It should be parched by the sun to hasten deterioration.

Once a year the garden should be covered with manure. It should be placed on the soil late in the fall before the ground is spaded or plowed. Horse manure is best, and fresh manure is not nearly so good as rotted manure. Being put on in the fall and plowed under it has all winter in which to mix with the earth and the snows and rain will help greatly in rotting it.

Every garden book should contain *a table for guidance in fertilizing the garden.* The following table, borrowed from a reliable authority, is highly recommended by two gardeners who have given it practical tests:

Per sq. yd.		*When to apply*	*Remark*
Sulphate of Ammonia	½ oz.	Spring	¼ oz. may be mixed with 1 gal. of water
Nitrate of Soda	½ oz.	During growth of plants	Same quantity if mixed with water
Sulphate of Magnesia	½ oz.	Spring	
Sulphate of Iron	½ oz.	Spring	Same quantity to 2 gal. of water
Guano	1 oz.	Spring or summer	½ oz. to gal. of water
Dried Blood	2 oz.	Spring	1 oz. to gal. of water (instead of ammonia)

Per sq. yd.		*When to apply*	*Remark*
Nitrate of Potash	½ oz.	Spring	½ oz. to gal. of water
Crushed Bone or Bone Meal	2 oz.	Autumn	Used in connection with nitrogen and potash
Basic Slag	4 oz.	Autumn	(Used instead of bone)
Kainite	½ oz.	Spring or autumn	

Soil which has been chosen in the fall and stored away during the winter will not be likely to contain fungus, and it will be sufficiently mellowed to avoid hurting the most delicate plants. *If the soil is too heavy*, it will be benefited by having mixed with it a little coal ashes or fine sand.

If wood ashes are sprinkled over the garden just before a rain or just before watering it, the soil will be uniformly supplied with potash and will show the benefit it has derived by vigorous growth of the plants in and near.

When you are in doubt just what fertilizer a plant needs, experiment with just a small portion at a time. If the fertilizer you first decide upon seems to invigorate the plant, then add more a few days later. If it has no effect, or if it has a bad effect, use a contrasting fertilizer.

Where there is too much sand the ground is not very fertile, but *sand insures drainage and its presence also induces* early planting, as sandy soil grows warm much earlier in the season than soil which contains little or no sand.

The soil is too wet for cultivation if it sticks together when rolled into a ball. *If soil is plowed while wet,* there will be hard, rough lumps when it is dry.

When planting seed, see that the soil is well pulverized beforehand. Hard lumps will be a great handicap in germination as it will be almost impossible for tender young shoots to push their way through.

Dried blood from cattle contains a large percentage of nitrogen and is especially valuable for those plants grown for leaves. Nitrogen produces large leaves and beautiful deep coloring.

Rotting sawdust breeds worms and certain kinds of insects which are harmful to plant life. Clean up the garden!

Vegetation which is badly infested by bugs should have applied to it water to which has been added a little household ammonia. Ammonia both fertilizes

the soil and kills the bugs. Water which has been used for washing clothes or dishes will answer the purpose just as well as fresh water.

To prepare compost, secure fresh manure, either fresh or partly rotted. Pile it up in a pile about three or four feet all dimensions, moisten thoroughly, and let stand a week. Turn it over and moisten again. Repeat several times until it seems thoroughly rotted. This is a natural fertilizer and there is nothing better for certain vegetables. All artificial fertilizers try to imitate the qualities of compost in a concentrated form.

Composted manure should be spread on the soil to a depth of two or three inches and thoroughly worked in. The amount used must be determined by the nature of the plants to be grown

Be careful to remove all *sticks, trash and stone* from manure before putting it on the garden. This foreign material will not fertilize and *will only retard the growth of the roots* and young plants.

Commercial fertilizers are usually very strongly condensed and *should not be put on the soil too heavily.* As a rule, they should not be put on the roots, but should be placed in the ground several

inches from the plant, if it is a small plant, and a foot or two away, if it is a plant having spreading roots. The roots will reach out for their food, and if put too close to the plant, the plant may become burned and the roots will not be fed. The manufacturers of most reliable fertilizers give accurate instructions as to use.

Different kinds of vegetation require different *fertilization*. *Sheep manure* is best for some plants, *compost* for others, *barnyard fertilizer* for others, etc. Find out just what fertilizer your particular plants need.

The value of *compost* can be added to by sprinkling finely ground raw *phosphatic rock* over the pile each time it is turned over. This helps to hold the *ammonia* and strengthens the *fertilization*.

A good *fertilizer* will analyze about 3% *nitrogen*, 8% available *phosphoric acid*, and 8% *potash*, and should be used at the rate of eight pounds to the square rod. This should be applied just previous to planting and should be thoroughly worked into the soil for a depth of three or four inches.

Soil that is used every year should be occasionally limed. Either air-slaked or water-slaked lime should be applied at the rate of about 2000

pounds to the acre. It should be put on after plowing or deep harrowing, and should be harrowed into the surface three or four inches.

The more you hoe the less you will have to pay out for *fertilizer.*

In November manure and plow the garden and leave it in a rough state. It will dry out quickly and will be in excellent condition for working and planting in the springtime.

Good well-rotted *barnyard manure has no superior for garden crops.* Manure from *fowls* is especially adapted for dropping in the hills or rows of plants.

On a large tract, ten cords of *compost* to the acre is not too much.

Nitrate of soda is a strong quick-acting fertilizer, but it must be used with care. Too much applied around a plant at one time will injure and sometimes kill. A teaspoonful is a sufficient dose for a *cabbage, pepper plant, or eggplant.*

Lime aids nitrification and liberates plant food from insoluble forms of combination. Heavy *clays,* rich in insoluble forms of *potash* and soils

containing large quantities of *humus* are benefited by the use of lime.

Sulphate of ammonia and *dried blood from cattle* (dried at the abattoirs) are most important purely *nitrogenous fertilizers.*

Sulphate of potash and muriate of potash are splendid potash *fertilizers* and immediately available as plant food.

Wood ashes contain soluble potash and it is in good form of combination. Placed at the roots of large plants, they invigorate them wonderfully. They can be put on at any time with equal advantage.

Nitrogen is the fertilizer that promotes growth and gives color and size to the foliage. *Phosphates promote both flowering and fruitfulness;* examine your packages of commercial fertilizer and know what you are giving your plants as food.

Crushed bone is a phosphate. Basic slag answers the purpose of bone, and either may be used two ounces to the square yard in the autumn, dug or surface dressed. Four ounces of basic slag will not be too large a proportion.

A combination of nitrogen, phosphate, and potash fertilizers may be thoroughly mixed and applied at one time. In this case they should be all thoroughly worked into the soil for from two to four inches.

Sour soils are neutralized by the action of lime. Where moss and sour grass grow, the soil is almost certain to be sour, requiring a liberal application of lime.

Before purchasing lime in large quantities a sample should be sent to the *State Agricultural station* for analysis, or it is likely that a great waste of both time and money may ensue. (A list of the stations is given elsewhere in this book.)

The most important *phosphate fertilizers* are the ground-rock phosphates and the superphosphates made from them.

Lime or coal ashes will help *to hold sandy soil together* and thus conserve moisture and retain plant food.

Lime will *make clay soil more porous.* Coal ash is not a food as is wood ash.

If you use a larger quantity of a commercial fertilizer than is recommended in the directions on

the package, you are endangering the plant's life. The manufacturers will usually recommend all it is safe for you to use. They want to sell their fertilizer.

An ounce of guano mixed in five or six quarts of water makes *an excellent liquid fertilizer for growing plants.*

Do not apply nitrate of soda directly to the roots or foliage of a plant. It is a very strong fertilizer and will burn the tender plants. Buried in the soil near the roots is the method of application.

Old vegetation such as cabbage plants, cauliflower, leaves of beets, etc., should be buried or piled up with earth thrown over it *to make humus.* The soil needs an application of humus at least once a year when the ground is in constant use.

Lime is excellent for mixing with clay soil to make it more friable. It should be mixed with the clay and left to stand for several weeks before fertilizers are added.

Phosphatic rock sprinkled over manure when preparing compost *will strengthen the fertilizer and cause the manure to rot* quickly as well. The compost should be turned over every two or three

days and the phosphatic rock applied each time it is turned. This process should be repeated for several weeks.

Greasy water in which dishes have been washed is very beneficial for the garden. If the kitchen garden is close to the kitchen the chances are that the vegetation will grow and flourish luxuriantly.

Fertilizer from the chicken house should always be well worked into the soil. Properly applied it is one of the best fertilizers known to gardening. There is not danger of burning the plants by its use as there is in using fresh manure from the stable.

Sheep manure is excellent as a fertilizer. If it is applied in the fall and worked into the soil to a depth of several inches, the ground will be in splendid condition for spring planting.

Any manure applied to a growing plant should be buried at a slight distance from the main stem but not so far that the roots cannot reach out to it.

A good liquid fertilizer for small plants is composed of two ounces of ammonium chloride dissolved in two quarts of water, to which should be added four ounces of sodium nitrate and four ounces of sodium phosphate. This should be carefully

strained through a fairly thick cloth before using. Half a teaspoonful to a pint of water is enough for the average plant.

When wood ashes are used in the garden, they should be sifted in order to remove all the lumps and cinders which will be detrimental to young, tender roots.

Manure tempers the soil and provides warmth when used as a winter covering for plants.

Old shavings or sawdust are not advised as bedding as the tendency will be to produce sourness in the soil and this will have a bad effect on the vegetables. Clean soil is essential for good growth.

Manure will help to hold the soil to the roots of plants and half an inch in the bottom of flats before filling them with soil will yield very satisfactory results.

After plowing the next important step is to smooth and pulverize the soil. If it is well prepared, the work of caring for vegetables will be materially lessened. The pulverizing should extend to a depth of three or four inches.

Sandy soils will bear plowing much earlier than heavy clay soils. If the soil sticks together to

form a ball when squeezed in the hand it is too wet for working, and soil should never be worked when wet unless you would have rough lumps afterward.

Where soil is difficult to drain, it is an advantage to set plants on ridges; cabbage, cauliflower, and similar crops can be grown to advantage in this way in many localities, while a raised bed of six to twelve inches in width will prove advantageous in beets, radishes, onions, etc.

Heavy clay soils should have a good drainage and sandy soils having a clay foundation are greatly improved by having all excess moisture drained off quickly.

The soil for general vegetable growing, i. e., where vegetables which properly call for different fertilizers are grown is a rich, friable well-drained loam. One containing some sand is desirable, since such soils warm up earlier in the spring.

THE HOTBED AND COLD-FRAME

A HOTBED is a most desirable acquisition to the garden in any locality. In a warm climate it enables the gardener to start his young plants during the winter months, and thus gives him a very long gardening season, while in a section of the country where the summers are short, it is a necessity if one would make it worth while having a garden at all. When it is desired to keep the plants from fall until spring, it can be best done in a greenhouse, but failing to have a greenhouse, a hotbed will do very well. By the use of a hotbed, plants can be hardened gradually to stand cooler weather and thus be saved from the blight of a sudden and severe frost. It is not unusual for the gardener who sows in the open ground to lose his entire first crop of seedlings.

In transplanting from the hotbed, only a certain number of the plants should be set out at one time, and these should be watched and tended to make sure they are not going to be killed by cold before

the remaining plants which have been left in the hotbed are thrown away, or, let us hope, given to a friend.

The location of the hotbed is most important. It should always be in a warm, sunny spot, well protected from the cold north and east winds, and, if possible, it should be near some sort of water supply to make sure that enough water will be provided. In making the hotbed, allow plenty of room for the plants to grow to a good size before transplanting. While plants should not attain too much growth, they should be strong and sturdy before taken from their first home. But in allowing for growth, do not go to the other extreme and make the cover too high, or there may be too much cold air stored away in the frame, and the sun's rays will not strike with the necessary force the young plants so much in need of warmth. The heat from the bottom of the hotbed, supplied by the manure foundation, is not the only heat required for the life and growth of the plants.

In supplying the manure for the hotbed, see that it does not contain too much straw or other refuse, otherwise the ground will grow cold quickly. Hotbeds may be heated artificially by means of pipes running from the heater in the greenhouse or from the dwelling house, but in using artificial

heat there is danger of keeping the hotbed too hot, and thus making the young plants tender. In the case of artificial heat, a thermometer always should be kept in the hotbed, and when the air is too warm, the heat should be turned off, or if the day is pleasant, the air may be cooled by ventilating.

Don't forget the hotbed on a cool night. If you do, you are likely to lose your crop, and it takes time to start another. If the night is unusually cold after having had some rather mild weather, cover the hotbed with a heavy canvas, with boards, or with a layer of straw or manure. An old blanket will serve as well as anything else, and if nothing else is convenient, a layer of earth will answer, though there is more labor attached to applying this covering. There can be purchased at any large seed house a mat of straw or burlap for protecting the hotbed. When the hotbed is artificially heated do not make the mistake of turning on too much heat at night instead of using covering. If the plants are kept unusually warm for a few hours, they will need another hardening before they are again exposed.

A cold-frame differs from a hotbed in that it is not supplied with heat. The cold-frame, as well as the hotbed, should be carefully located, and all protection possible given it from cold winds. In

very cold climates, the cold-frame usually receives the young plants from the hotbed for the purpose of hardening them before transplanting to the out-of-doors. A cold-frame which has a high roof is much to be preferred to the cold-frame where the glass is close to the surface of the earth, as ventilation will be better and the temperature will be more even. For forcing vegetables, there is no better medium than the cold-frame, though it must be remembered that forced vegetables are never as palatable as those which grow naturally, and often they are lacking in the proper food strength which they should have, even if they are not made positively unhealthy from having been forced with chemical fertilizer. Forcing is a universal practice, but it is not to be recommended.

When there have been several days of cool, damp weather, and the sun then comes out bright and strong, there is great danger of the hotbed and cold-frame plants becoming scalded or of being withered from lack of moisture. Sudden changes in climate require very careful manipulation of the hotbed and cold-frame, and nothing is so beneficial as experience. So many things govern the success of a hotbed and cold-frame, and conditions vary so, that it is impossible to give any certain rules for their general care.

Be careful when watering the hotbed and cold-frame. They should never be soaked, but should be watered thoroughly. A very fine spray should be used that the water may be applied without much force, as to dash the water on will result not only in washing up seeds or seedlings but will result in packing the soil down, thus making it hard when it is dry.

Ventilation for young plants should be given gradually, and it should first be given on a mild, sunny day. Half an inch for an hour will be enough air for the first couple of days, and later this aperture may be increased to an inch, two inches, three inches, etc., also increasing the length of time until it is left wide open all day. It should always be closed at night until the plants are almost ready to be set in the open ground, and then it should be left open to give them the same exposure that they will later receive. If this care is exercised not even the most tender plants will suffer from transporting.

To make a hotbed: After determining the size of the hotbed, earth should be removed from the chosen location and boards set in the ground in the form of a box with the bottom out. (In fact, if a large box can be procured and buried, much labor will be spared.) The back of the hotbed

boards should be about a foot higher than those at the front, and the sides should slope accordingly. This gives a slant and the water will run off quickly. Manure should be thrown into the hotbed pit in layers, each layer being tramped down before the next is added. This should be continued until the pit is filled to within six inches of the top. Place a glass over the hotbed and leave it alone for two or three weeks. Keep a thermometer inside and when the temperature has risen to 120 degrees Fahrenheit and then dropped to ninety degrees, place four or five inches of soil on top of the manure. It will be better to have just a little manure mixed with this soil, but this manure should be well rotted. The soil is then ready for seed to be planted.

Double sash is recommended for a hotbed in the coldest weather, but *straw mats* laid over the sash at night will serve very well.

Hotbeds for growing lettuce, radishes, parsely, and other vegetables of a like nature may be prepared in the following manner:

Prepare beds in the usual way. If you have not old sash of proper size, make light wooden frames and nail projecting strips upon all four sides to be fitted over the hotbed frame in the order of a

box lid. Then nail a few narrow slats across for support. Over this tack new unbleached muslin. Use plenty of tacks and stretch the muslin as tightly as possible. Then apply a coat of melted paraffin to the entire surface. Parafine can be kept in a liquid state as long as the receptacle containing it stands in a kettle of hot water. The brush used for the purpose must be dipped in boiling water before the work begins. When there is the prospect of a snowstorm, an armful of straw thrown over the sash will prevent the muslin from sagging. These frames are cheap and can be stored away in summer for the next year's use.

Hotbeds should be uncovered during the day in April, provided the weather is the usual April weather, so the plants may become accustomed to outdoor life. They should be covered at night, however, as at this season a sudden drop in the temperature is likely to occur any night.

Hotbeds should be watered on bright days and only in the morning. Watering at night may cause the plants to take cold.

The hotbeds should have ventilation on bright days as soon as the weather moderates, and by raising

the side opposite from the wind there will not be danger of creating a draft.

Hotbeds are not expensive luxuries as the home gardener often thinks. One large enough to hold nearly a thousand young plants at one time need cost only fifteen dollars. Small hotbeds and several of them, however, are more satisfactory than one large one. Small ones are easier to handle and plants of different ages may be ventilated in safety if they are kept to themselves.

Plants grown in a hothouse, hotbed, or cold-frame will require hardening before planting in the garden. This should be begun by ventilation and by reducing the amount of water applied to the plant bed, though the plants should not become so dry that the plants will wilt or have their growth checked seriously. After a few days, the plants should be left uncovered during a mild day and on mild nights.

In the North the hotbed should be started in February or early in March, in order that such plants as the tomato and early cabbage may get a good start by the time the open ground is ready for them.

The hotbed should always face the south, and the south side of a dwelling, tight-board fence, or a

hedge will afford protection and prove a good location.

When purchasing glass for the cold-frame or hotbed, select glass that has not been glazed and the cost will be materially reduced. Clear, glazed glass is prettier, certainly, but it has no other advantage over unglazed glass.

Whitewash the inside of flats, hotbeds, and wooden boxes in which plants are to grow and there will not be so much danger from insects eating the plants as they come up. This will also tend to keep the box from rotting so soon.

Plants usually dry most rapidly in the north side of the hotbed as the condensed moisture will run to the south side and drop off into the ground. Remember this *when watering the plants in the hotbed.*

Keep the soil in flats, the hotbed, and boxes an inch or more below the edge. This will give the water a chance to stand long enough to sink into the surface.

An inch of manure placed over the hotbed on a very cold night will provide warmth and prevent the young plants from freezing. This is an excellent substi-

tute for double sash, which are not needed, as a rule, very many nights during the winter except in extremely severe climates.

If a flat sets in a metal receptacle which is an inch or two too large, *water may be poured into the receptacle* and thus allowed to soak into the earth in the flat *without danger of washing up young plants or tiny seed.*

When the sun's rays are too strong for the plants in the hotbed, place a covering of straw or leaves over the glass. This will afford the necessary shade without cutting off all the warmth. A piece of thin green cloth will answer the purpose well if leaves are not available.

The durable hotbed is the hotbed made of concrete. It costs more to build but if the location selected is to remain the permanent site for the hotbed, it is far wiser to build of concrete than of wood.

SEED

THE first essential of seed is freshness. Some seed will retain life for two or more years, but the majority of seed are best planted if not more than one year old. As to the age we must rely upon the seedsmen, so be sure that the reputation of the dealer is good. Seed sold in extraordinarily cheap packages are nearly always poor seed and are simply discarded by good seedsmen, purchased by the conscienceless dealers, and put up in new papers to prove a disappointment to the gardener. Seed can be tested by throwing them on a hot coal or by placing them in a pail of water. If they burn with a crackle, they are likely to be a good lot of seed, and if they sink to the bottom of the pail, they can be depended upon usually to germinate. It is dangerous for an amateur to depend upon seed of his own saving, for much skill and experience is required to save good seed and an amateur may lose a great deal of valuable time waiting for the seeds which never germinate. It

is safe to plant a few of the amateur's seeds but not to depend upon them for a crop.

When the seedsmen gather their seed only half the work is done, for storage is as important as production. Above all, the seed should be kept in a cool, dry place until it is time for sowing, as to store them in a warm place, more or less damp, will result in their germination before the allotted time.

While seed should be kept fairly moist and rather warm after planting, there is danger of keeping them too moist and thus causing them to rot, or the young seedling to "damp off." Both moisture and warmth should be uniform. If the seed are kept fairly warm for a few days, then allowed to become chilled, the germination will be checked, while alternate sogginess and dryness will result in killing the life that is in the seed.

Botany will have an added interest for the gardener who is raising his own seed, and in order to appreciate plant growth a little knowledge must be had with regard to pollination. Pollen lodges on the stigmatic part of the pistil where it germinates, sending out tubes whereby the male generative cell passes to the ovule, fusing with the egg cell, from which the seed develops.

When plants are started from seed, two things

to remember are that the soil should be well pulverized by being sifted, and the seed should be sown according to the required depth for each variety of seed. A good depth for one kind of seed is disastrous for another variety. Too, whether seed should be sown in trenches or broadcast is also to be determined. In most instances rows are advisable as making cultivation easier, and, in cases where plants must be staked, or pods picked, rows are almost necessary.

In all cases seed should have a firm soil. Where the soil is too loose, fine seed will be blown by the winds, and large seed will not have a good hold for root growth. But whatever you do, purchase plenty of seed. Seed is inexpensive, and if one crop does not mature, or if a cold wave settles the fate of the young seedlings as soon as they appear above ground, no time should be lost in planting a second time.

With seed that germinate slowly it is best to plant them very thick, that there may be force in breaking the soil. Which seed should be started in seedbed or in paper cups depends entirely upon the nature of the seed.

In saving seed, certain plants should be set aside for seeding, and they should always be some

of the very best plants. Weak plants will produce poor seed. These plants should not be allowed to bear too prolifically, but should be carefully tended and all superfluous blossoms removed.

In purchasing seeds, the best should always be purchased regardless of price, and seeds should be purchased only from reliable seedsmen. There are firms who have built up long-standing reputations on their seeds and they are the ones who should be patronized.

Seeds should be of the previous season's growth. There are a few kinds of seeds that will keep well for more than one season but most plants should be started from the freshest of seeds.

In planting seeds in large tracts, practically all can be planted with the seed drill in a really better manner than by hand, and a saving in labor will be accomplished as well.

Seeds should always be sown in straight rows regardless of where the planting is made. The seedlings will be more uniform in size and shape if this is done, and thinning can be more easily accomplished.

When the soil of the seed bed is not too wet it should be pressed down firmly before laying it off in rows.

After the seeds are sown it should be again pressed down by means of a smooth board.

No rule can be given for *the depth to which seeds should be planted.* The depth varies with the kind of seed and with the character and condition of the soil. Heavy clay and moist soils call for lighter covering than sandy or dry soils, and small seeds should not be planted to as great depth as larger ones. Two to three times the size of the seed is the general practice.

A thin lath will be most useful *in making grooves for seeds* when planting in boxes or a small bed.

The supply of seed should be procured in advance of the time they are to be planted in order to have them ready at the most appropriate time.

The simplest method of starting seeds early is to plant them in a box placed in a south window. After the plants appear, the box should be turned each day to prevent the plants drawing toward the light.

In sowing seed late in the season, they can usually be sown to advantage slightly deeper than earlier in the year because the ground is warm to a greater depth.

Lettuce seeds should be scattered over the surface of the soil and a little fine earth sprinkled lightly over them.

Remember that seeds need air, therefore should not be planted too deep; they need *moisture* in order to swell and sprout; they need *warmth* or they will freeze.

Seeds should be well watered as soon as sown, by means of a hose and fine nozzle, or an extremely fine-holed watering can, for the garden, and the use of a bulb syringe spray for the boxes.

When growing vegetables for producing seeds, every flower and fruit and pod should be watched closely. One poor seed may be the means of starting a crop of poor vegetables. Only a few pods or fruit should be allowed to mature on each plant or vine. All the poorer ones should be picked off at an early stage.

When seed boxes are started indoors near a window, the box should be turned around every day to give every seed a fair chance at warmth and light.

When planting a large quantity of seed, be sure to use a seed drill. The seed will be sown more uniformly and the back will be saved many aches.

For successful germination of seed, the air temperature should be about 60 degrees Fahrenheit and the soil temperature from 65 degrees to 70 degrees.

Seed obtained from plants which were planted before the ground was thoroughly warmed in the spring will produce sickly, puny plants.

To have the seed garden well prepared will influence the garden very much indeed. A poorly prepared seed bed means a failure from the beginning. The *soil should be pulverized by cultivating with a fork*, if a small garden, or by spading and plowing if a large tract is under cultivation.

In order to have proper drainage, the seed bed should be a trifle higher than the ground around it. This can be easily accomplished by loosening the earth and piling it not far from the spaces where it came but on places that have not been used.

Large gardens should have the soil thoroughly harrowed and raked after spading or plowing and the soil should not be allowed to dry out after harrowing it. The lumps will break up easily while the soil is still moist. A seed bed lacking in moisture and full of lumps will produce a poor crop.

The most thorough way of harrowing is to harrow in straight rows and then the second time at right angles to the first rows. Harrowing five or six times will not be too much. The finer the soil the easier for the plants when the *seeds* have germinated.

All *stones and trash* should be removed from the seed bed and the smaller the *seed*, the finer the soil should be. Roots will not feed on stones or branches that are not rotted.

Good soil for the seed bed consists of one part of well-rotted manure, two parts of good garden loam or rotted seeds, and one part of sharp, fine sand. The manure should be thoroughly rotted but it should not have been exposed to the weather so long that the strength has been leached out of it. All the ingredients should be thoroughly mixed, then sifted and placed in boxes ready for sowing the seed.

Leaf-mold or peat is excellent in preparing soil *for the seed bed.*

To kill the seeds of weeds and spores of fungus diseases that are present in soil which is being prepared for a seed bed, place the soil in pans and set in the oven or in the furnace for an hour or two.

Unless there is absolute certainty that these dangers are not present, this method had better be followed, otherwise a poor lot of young plants may be the result.

The seed bed should never be allowed to become dry, but too much water should not be applied. Too much moisture will exclude air and prevent germination, as well as rot the seeds. Some moisture is necessary, however, to promote germination.

Where there are dry spots in an otherwise moist seed bed, water only the dry spots, using a fine nozzle in order that too much water will not pour out and spread over the already damp places.

It is not advisable for the gardener of a small plot to save *seeds* of all his crops, but seeds of *melons*, *corn*, and other things which are so hard to judge, and of which there are such a variety of poor ones, will be likely to pay handsomely for the trouble.

For the first two or three days after sowing seed, they should be kept in the shade. After that they may be placed in the sunlight when the rays of the sun acting on the thoroughly moistened soil will hasten germination.

The time to water a garden depends upon the conditions. During the early spring months the early morning hours will do as well as any other time, but in the heat of summer, it should always be done after the sun has gone down, in order that the sun will not come down at once and scald the plants. At night, too, more water soaks into the ground and not so much is lost by evaporation.

Sprinkling will wash the dust off the plants and keep them clean, hence can be done to advantage after a rain that has beat dirt upon small plants, but for answering the purpose of providing moisture it is a useless proceeding.

Small seeds should be watered with a very fine spray and when planted in boxes, a small bulb syringe spray should be used. Even when the plants have come through the ground it is not difficult to wash them up, or to so loosen the soil that the roots will not take firm hold.

Flooding is most beneficial as it waters the roots well and does not tend to wash up plants. This will give excellent results in watering seed and small plants. In order to flood, there should be little ditches running between the rows of plants.

Better results are obtained by *watering thoroughly* every three or four days than by watering slightly every day. When only the surface of the soil is wet, the soil will bake and much damage will be done.

Remember that lack of moisture will cut the yield of any crop, and that *tillage conserves soil moisture.*

In sections having light soils, or soils deficient in moisture, a very satisfactory plan during the dry seasons is to cover the soil with a mulch of straw or manure during the early part of the summer, instead of cultivating.

Seed planted in the open ground should be planted slightly deeper than those sown in boxes indoors or in the hotbed. The ground is more likely to become chilled than the earth indoors.

Different kinds of seed of the same size should be planted in close proximity, as they will require the same depth of covering and practically the same amount of moisture, air, and warmth for germination.

The skin of large seed should be loosened before planting, and this is best done by soaking the seed

overnight in cold water or for three or fours hours in lukewarm water. All seed may be soaked for a short while without harm being done, and nearly all seed will germinate more quickly by going through this process.

PLANTING

If the garden must necessarily be small, vegetables in common use and those easiest to grow are advised. Tomatoes, lettuce, beans, beets, carrots, onions, parsley, radishes, and corn, where the acreage permits, will probably yield the most satisfactory products for the new gardener. The gardener old at the service will need no advice along this line.

Whether the planting of seed or the setting out of young plants is advisable, depends entirely upon the nature of the particular plant as well as upon how early in the season the planting is done and how much time the gardener wishes to spend on preliminary work. Some plants, like the tomato, parsley, lettuce, cabbage, eggplant, peppers, and rhubarb may readily be started by the seedsmen, but certain other vegetables, such as beets, turnips, members of the melon family, beans, peas, corn, spinach, and radishes had best be planted where they are to grow.

When purchasing plants, select good strong ones and do not accept those that are wilted or parched. A height of three to four inches should be acquired by most plants before they are transplanted, and it is best to wait another week or two in order to get plants of a safe size for transplanting than select spindly young plants which have been rushed by the seedsmen with a view to greater commercial profit by being the first in the market.

If the plan of the garden is made some time before the actual planting is begun, so much the better, but the amateur must give a great deal of thought to which vegetables will need an excess of moisture and which an abundance of sunlight.

Lettuce may be planted in rows alongside rows of taller vegetables which will shade it from all but the early morning sun, while tomatoes, onions, beets, and other vegetables needing warmth should be given the benefit of a location which will receive the sunlight all day long.

THINNING AND TRANSPLANTING

WHEN thinning, do it lavishly. A few strong plants will yield a far larger and finer crop than a number of sickly-looking plants which have been overcrowded in the bed. Thinning should be done just as soon as a determination is reached as to which are the strongest plants. The sooner the permanent plants are left to themselves the more rapidly they will grow. To delay thinning in order to be able to use certain young plants for "greens" is a mistake and the result in the long run will be unsatisfactory. Two thinnings will probably be better than one, as some seedlings which start off with a wonderful growth do not live up to their promise. And here is a very sufficient reason for planting plenty of seed.

So many suggestions with reference to transplanting are given among the hints in this book that little remains to be said here. One caution, however, cannot be given too frequently, and that is, *transplant with care.*

Many plants are benefited by transplanting. Find out which they are and plant early in order to get the best out of them. The proper time for transplanting depends upon the climate, the location, and the variety of plant. As a rule, transplanting should be done when a plant gets its first true leaves. This usually happens about a month after the seed is sown.

Before taking plants up for transplanting, the soil should be thoroughly watered and the water allowed to sink in, that the soil may adhere to the roots. If they are not set into the soil immediately they should be placed in a shady place to prevent withering.

If the plants which have just been transplanted *have a number of leaves,* the largest should be pinched off as leaves give out a great deal of the plant's moisture and the loss of too much water is injurious to the plant. Having to feed only a few *leaves,* the plant will grow more vigorously.

All plants should be *watered immediately after transplanting,* and the soil pressed firmly down around them. The foot is the best medium for this purpose as the planter can tell just what

pressure is being put upon the soil and can get at all parts.

Plants which bear transplanting poorly should be started by planting the seeds in dirt bands or small paper cups. When the plant is ready for transplanting, a hole should be dug, the band torn loose carefully, in order not to loosen the earth around the plant's roots, and band, or cup, planted with the plant. The paper will soon disintegrate and help to fertilize the plant.

Great care should be taken *in handling the roots of plants that are being transplanted.* When handled carefully transplanting benefits the roots of most plants, as they have new soil into which they can spread, and transplanting has a tendency to increase the number of roots. Celery and other plants which are grown for their tops are nearly always benefited by transplanting.

Such garden crops as *melons, cucumbers, and beans do not transplant readily* from the seed bed to the open ground and extra care should be used if they must be transplanted. As these plants have strong roots, they may be planted in thin wooden berry boxes, with the bottom knocked loose that it may easily be taken off just before transplanting.

The roots will push down and around the box and will not be crowded by it even if it does not rot during the season.

Another method of transplanting plants which should be handled with extra caution, and which do not court transplanting, is to plant the seed in sod, the grass roots turned upward. When the plants are ready, sod and all should be planted and the grass roots and leaves will go toward making *humus*.

If plants are thinned before transplanting, the sod may be cut in squares with a knife and quite a large piece of earth transplanted with each plant.

To cover young plants which have just been transplanted with old tin cans, flower pots, and other air-tight covers *will have a most disastrous effect on the plants* as they will cut off the air and thus make the plants have a sickly, spindly growth, if they live at all. A handful of dried grass or hay will be all the covering necessary and plenty of air will reach the plants with such light covering.

Transplanting should never be done when the ground is wet, nor while the rain is falling. After a rain, when the ground has dried enough to crumble

in the hand, is the time to set out young plants. The atmosphere will be clear and somewhat moist and there will be no danger from parching heat very soon.

Large plants require more careful handling than small plants when transplanting. They should be set a bit deeper in the earth than they were setting before transplanting, the roots should be well watered and the earth pressed down firmly around them. It is best to use the foot when pressing the earth down, as to use the hoe may result in bruising the tender branches or stem.

When the soil in transplanting does not adhere to the roots of a plant, it is well to puddle them after taking the plant up. Dig a hole in the earth near the plant bed, and into this put a thin slime consisting of a little clay, cow manure, and water. Dip the roots of the plants up and down in this mixture, thoroughly coating them. This coating will prevent the air from reaching the rootlets immediately and will aid in securing direct contact between the roots and the soil.

The soil should be worked over and put in good condition *before transplanting*, the exact location of the plants marked, and everything done to

hasten the process of planting. The late afternoon or early evening is the best time to transplant—after the heat of the day and before the atmosphere is chilled.

Plants should be set a trifle deeper in the garden than they were in the plant bed.

A sickly looking plant is often benefited by being transplanted, as all that it may need is nourishment which it cannot derive from the old soil.

To transplant tender plants in the hot sun is likely to result in sun-scald. The late afternoon is the best time for transplanting. Hothouse plants should not be transplanted too early in the season. All danger of frost should be passed before any tender vegetation should be set in the ground.

Tender plants should first be thinned that a large clump of earth may be removed with those that are being transplanted. Seed planted broadcast should be thinned more generously than those planted in rows, or the plants will be too crowded to get enough nourishment and spindly growth will be the result.

Never spare thinning in order to have more plants. A few vigorous plants will yield a far

more profitable crop than a great many poor ones. Thinning should be done as soon as the plants are large enough to pull and before they begin to grow spindly from being overcrowded.

The *aim in thinning* is to remove the centers of the thick bunches, leaving the spaces as uniform as possible. As a rule, the best plants should be allowed to remain but proper spacing must not be sacrificed in order to save the best plants. Poorer ones will grow if given the proper care.

It is absolutely necessary for many plants to be thinned. Such vegetables as carrots, beets, salsify, turnips, radishes, and onions cannot grow and develop if they are crowded. Plants like *beans, peas, lettuce*, and several others will grow but the yield will be materially reduced.

The distance given plants depends upon the plant. Small root crops like *radishes* should stand about two inches apart. Beets, carrots, and other plants with large roots, and roots which are the food part of the plant, should have from four to six inches space on each side. Other plants depend upon the variety, such as peas and beans.

Study the plants you are to start *in order to*

avoid re-planting from carelessness. First obtain good, fresh seed. The time lost by planting poor seeds can never be made up. The season, the weather, and the soil should be taken into consideration, and if this were always done, re-planting would soon become an obsolete practice.

Re-plant only where the seeds do not come up, but do it just as soon as it is determined that the seeds are not going to come up. No time should be lost. A vegetable season is short at its best.

CULTIVATION

IF you do not mean to cultivate, and to cultivate regularly and thoroughly, then give up all thought of a garden. The garden should be cultivated at least once a week and it should be done *after* a rain, or after watering but not immediately after, as when wet earth is cultivated and left in lumps to harden, another cultivation will be necessary to break up the lumps and permit air to enter the soil. To cultivate before watering will also cause lumps to form. There is a "just the right time for cultivation" and it will pay every amateur to study the soil and learn just what condition it should be in for cultivation.

Because cultivation is so helpful in conserving moisture, very frequent cultivation should be given during a long dry spell. Cultivation at such a time should be merely surface cultivation as to dig too deep will bring to the surface somewhat moist earth which will soon dry out. To cultivate only an inch or two will tend to let in air

and yet prevent the moisture from oozing forth. The best time of the day for cultivating the garden is early in the morning while the dew is yet on the foliage. The air at this time is very invigorating both for plants and people, and aside from the great benefit to the plants, the gardener will derive a vast amount of benefit physically.

Something to consider in the cultivation of the garden is the kind of tool to use. A hoe of the right size will be most appreciated; a large hoe between rows, a small, sharp-bladed hoe for use between plants, and a fork or trowel for the very small, closely set vegetables. There is a right angle and a wrong angle at which to hold the hoe. That stoop of the shoulders from hoeing would not exist if the correct tools were used and the correct position assumed when holding them. There is no more reason for gardening causing the shoulders to droop than for gymnastic exercises, if the gardener would but learn to hold himself correctly and to use the proper implements while working. For one who can work with the left arm, a change is recommended, as this will prevent one from growing too fatigued, but at any rate a change in the position of holding the tools can be practiced by every one.

The garden should not be cultivated just after a rain or after being watered. If it is, the soil will dry in lumps and the harm done to the plant hardly be counteracted.

Too much importance cannot be placed upon cultivation of the garden. *During dry weather however, the cultivation should not exceed a depth of two inches.* Only the surface should be stirred in order to form a "dust mulch." This layer may become dry but it will prevent the escape of moisture through the pores of the soil. A layer of manure, for a distance of ten or twelve inches around certain vegetables, will be beneficial in preserving moisture, but it should not be heavy enough to exclude air, and it should not be put on plants if it is going to over-enrich them. The kind of manure should be suited to the plant.

Certain vegetables which do not require much heat, and do require moist soil, *may be protected* by placing a board near them in such way as to cut off the sun's rays. Stakes driven in the ground to lean the board on will answer the purpose very well.

Manure, straw, leaves, boards, pine boughs, and cloth may be used for covering to *protect annuals*

from the winter's blast. Coarse, loose covering is better than finely compacted substances. To protect plants from the extreme cold will mean earlier spring foliage.

Cultivation destroys weeds, breaks up the soil, and gives the roots a chance to break through hard lumps, forms a dust mulch and thus conserves moisture, makes the food more easily available to plants, warms the soil, permits air to reach the roots, and adds humus to the soil by plowing under bits of vegetation. *Cultivate your garden!*

The *cultivation* of berries, trees, and all biennials *should not be given too early in the spring* or the plants may become chilled and the young roots be injured.

Mark the spot where seed for late crops are planted or *cultivation may result in destroying the entire crop.*

Frequent cultivation should be given in dry weather. Cultivation is a substitute for fertilization and water.

The best time of day for cultivating the garden is early in the morning while the dew is still on the plants. Besides the benefit to the plants the gard-

ener will be much benefited by the early morning air.

Those who suffer with backache from gardening will be most pleased to know that a wheel hoe will afford relief. Cultivating the garden by means of the wheel hoe is far from being the hard task which hoeing has always proven itself to be.

The hoe is dangerous to small plants. One whack and the plant is lost. It is far better to use a fork than to lose plants which you have taken so much pains to give a growing start. Even if the plant is not cut, the hoe cannot get around fine young roots and stir the soil properly.

The time to cultivate the garden is before the *weeds* get a start above the ground, or else just as soon as the weeds have made an appearance. The larger the weed, the harder to eradicate the roots.

WATERING

WATERING the garden is futile if it is not done thoroughly. The conservation of moisture is the principal work in the garden, and if only the surface of the soil is wet, the earth will become hard after the moisture has evaporated, and the air, so necessary to the roots of vegetation, will be shut out. A good drenching twice a week will be far better than a light surface watering every day. If it is practical, flood the garden on watering days. The best time of day for watering the garden is not the day, but the night, as in watering at night all danger of sunscald will be avoided and the water will have ample time to penetrate to the roots and do its good work before the sun's rays begin to draw it heavenward. If it is not possible to water at night, then it should be done very early in the morning before the sun is up; and during the spring the early morning will answer nearly as well as the evening.

In watering long rows, wherever it can be prac-

tically managed, use a hose. In very dry climates, box sluices are advised. These sluices or troughs should have small holes in the sides for permitting the water to flow through to the surrounding earth, and if one cares to go to the expense, iron pipes may be fitted into the holes and the water run off at quite a distance from the sluice.

In watering seeded ground, a very fine spray should always be used or there will be danger of the seed being washed up before they have had time to germinate. Seeds that have been planted in flats small enough to handle comfortably may be watered satisfactorily by placing the flat in a tub of water, allowing the earth in the flat to soak the water up from the bottom. Very small plants which need careful handling should have the water applied by means of a dipper or other hand receptacle, and in watering large bushes or trees, care should be taken to see that the water does actually have a chance to get at the roots. A pipe a couple of inches in diameter driven into the ground near the roots will serve well for supplying water to the roots. After the pipe is driven in, it should be kept filled with water until all the surrounding earth appears moist.

When there is a long dry spell, all foliage should

be washed off by means of the garden hose in order that the leaves may be freed from dust and permitted to breathe. When using the hose for watering the soil, remove the nozzle from the hose and apply the hose directly to the ground. If holes are dug before applying the hose, the water will be the more easily forced into the ground.

Tender plants should have water applied very gently, either by a very light spray from the garden hose, by a watering pot with a spray attached to the mouth or by using a cup and a pail.

When pebbles or stones are not available as a foundation for securing drainage, clinkers from the coal stove will answer very well. A good supply of fertile soil should be placed over them, however, to make sure that the roots will obtain the required amount of nourishment before reaching the clinkers.

When plants are dry enough to wilt, they need water. This, however, is not true of *plants that are being hardened off*. They should not be given an abundant supply of water during the hardening process or they will "take cold."

Charcoal placed in the bottom of *the pail of water in which fresh vegetables are placed* to keep

fresh will be very beneficial. If the water is renewed, the charcoal should be renewed.

Vegetables will remain fresh longer if placed in salty water than if placed in fresh water.

Vegetables which are forced by artificial dressings are not as nutritious as vegetables which are allowed to take their natural time in maturing.

WEEDS

THE time to weed is before the weeds get a start or they will very shortly take from the earth so much nourishment that the vegetables will be stunted in growth, and to put off weeding for a few days is a dangerous habit for in a short time a lasting injury will be done to the plants. Why we have weeds is more or less conjectural. Perhaps they are for some good purpose, but so far it would seem that their only purpose is to encourage work in the open air.

Weeds have their favorites among the vegetable family, and some weeds which will persist in cultivating the society of one vegetable will not be attracted by another variety, hence a rotation of crops, or planting a different vegetable in a locality every couple of years will tend to check weed growth. There are times when nothing but weeding by hand, with a fork for getting after the roots, will answer the purpose. And not only weeds among vegetables should be destroyed, but the weeds in the immediate neighborhood of the

garden should be eradicated, for the weeds run quickly to seed and the wind is as able a carrier as even weeds could wish. Old piles of manure and refuse will harbor weeds and produce an abundance of seeds in a short while, hence it is absolutely necessary to keep the garden clean. Another caution with regard to weeds, is to be careful of your dealer when purchasing seed, for many weeds get their start from the package which is supposed to contain only vegetable seed.

In certain sections of the country we have dandelions, Queen Anne's lace, ragweed, chickory, plantains, etc., while in the Southern States there is a most tenacious and pernicious little grass called nut grass which, when it once has a firm foothold, is almost impossible to eradicate without a thorough and deep plowing. This little grass is quite pretty and its "nut," grown under the soil, is very good food for swine, and hogs are very effective in getting rid of it permanently. Unfortunately, however, the gardener of a small plot has no supply of swine helpers to turn loose in the garden patch, even if they could be guaranteed not to molest the vegetables.

On the following pages are various simple suggestions, harmless to human beings, for eradicating the different kinds of weeds.

Never let the weeds get a start. It is much easier to eradicate them while they are young and tender. Hardy roots will keep on growing long after the tops have been cut away.

A solution of ordinary cooking soda and boiling water will *kill weeds, root and tops.* It will, however, kill any vegetation with which it comes in contact and should be used cautiously when applying to weeds to make sure that it does not touch vegetables.

Queen Anne's lace, or the Wild Carrot denotes poor soil. It is very difficult to get rid of when it once has a good start and it will multiply and spread very rapidly. Where there is a large patch, it should be plowed up and all roots picked out and it is best to do this twice a season for two or three years, if possible, before using the land.

Strong salty water will kill weeds, and it will also kill other vegetation.

Concentrated lye is deadly to plant life, be it weed or vegetables.

A solution of sulphate of iron will kill chickweed but this should be used cautiously and always

with a hand sprayer as it is very injurious to the skin.

Boiling water in which has been dissolved strong washing soda will be very effective *in killing poison ivy and weeds* which have started growth in the garden.

INSECTS AND SPRAYS

FOR every variety of plant there is a species of insects. Diligence must be exercised constantly if one would control and destroy these little pests. Many and varied are the commercial spraying solutions to be purchased, but beware of the solution which is recommended for *all* species of insects. It is probably effective with none. A spray that will mean death to one species may be a tonic for another, and it behooves the gardener to make a study of insects in order to be able to note from the appearance just what nature of animal he is to fight. Insects from the same family may be so unlike that an amateur will think them a separate and distinct kind, but he can by close study learn to determine just what insects are attacking the vegetation in his own particular locality. When the variety of insect is known, half the battle is won. There then remain but to find out what will kill it, and procure the recommended solution or powder, as the case may be,

and watch and work during the entire gardening season. That is all!

Certain insects follow certain vegetables. And when a garden bed has become badly infested with insects during a season, be sure not to plant the same vegetable there the next season. Insects multiply each year. The first year, they may be small in number, but the family will be very likely to have much more than doubled by another season if the gardener has been the least bit slack. And insects are often brought to the garden on plants which are purchased from the seedsman. Sometimes it is possible for even the most careful of seedsmen to guarantee he is not selling an insect with the plant. Therefore, I would suggest a thorough spraying of each plant as soon as it is set out.

When a plant has once become badly infested with bugs, it is the safest plan to pull up and burn the plant. Spraying sometimes is the means of washing insects off to crawl away and find a home on another plant. In carrying the infested plant from the garden, be careful not to strike it against other vegetation, or you may soon have to destroy that plant for the same reason.

In spraying, spray carefully, but be sure not to

use a poisonous mixture on foliage which is to be eaten by human beings, or cattle, and do not apply a poison to the flowers or fruit of the vegetables. Never use stale spraying solutions. Many solutions lose their strength shortly after being exposed to the air and your time and solution may be entirely wasted. For this reason, it is perhaps better to make up your solutions just as you need them. Recipes for the various solutions are given below and on the following pages.

All of the vegetable crops are subject to *attacks of insects and diseases.* Plants should be examined almost every day to see if the plants are dying or if insects have attacked them. Insects injurious to vegetables are divided into two classes, those which eat up the plant and those which suck the sap and cause the plant to die. The eating insect leaves the plant full of holes. Most of this variety can be controlled by spraying or by dusting poison on the leaves. *Paris Green and Arsenate of lead* are recommended for killing eating insects but these poisons are dangerous and must be handled with care. They should not be put on any vegetable that cannot be thoroughly washed before using and should not be used unless the consumer is to be aware of the fact of their use.

For the sucking insect show a specimen to the nearest gardener and get advice.

Strong soapsuds made by boiling one half pound of laundry soap in a gallon of water ***will kill plant lice.*** This should be used daily for three or four days, at least.

Bacterial diseases are caused by bacteria getting into the water canals of plants and shutting off the water. They ***can usually be controlled by spraying with Bordeaux mixture.*** Usually from three to five sprays will be sufficient.

The cabbage aphis which is often taken for ***mildew*** on the cabbage is best destroyed in the fall. The field should be completely cleaned and fed to the pigs, poultry or cattle.

Sucking insects can nearly always be destroyed by being doped with a solution of nicotine, *i.e.*, strong *tobacco* soaked for twenty-four hours in hot water, but applied cold.

Flea-beetles have in recent years been very destructive to young cabbage, radish, and turnip plants. *Tobacco* dust, freely applied will in most instances drive the pests away. *Lime* flavored

with *Paris Green or slug-shot* will help in some instances.

The troublesome little *maggot* which affects cabbage, radishes, onions, and a few other vegetables, *may be destroyed by dusting with a mixture of lime and tobacco.* The tobacco should be dried and ground to a powder before mixing with the lime.

Cabbage worms will usually succumb to a dusting of one part of fresh *Persian insect powder* to four parts of air-slaked *lime.* This should be dusted on the plants at regular intervals for several days.

Asparagus beetles can be controlled during the cutting season by letting a row or two go uncut. The pests will usually all go to the few uncut stalks and can be killed easily with *arsenical sprays.* All other rows should be cut closely.

Be on the spot with your spraying apparatus in good season or the *blight* will do a great deal of harm in the *potato* field. If the disease gets well under way it is very hard to conquer.

Watch carefully for *potato beetles.* Every beetle picked up and destroyed means preventing numbers of other beetles from multiplying.

Melons, cucumbers, and squash vines are often attacked by the yellow striped *squash-bug* when the plants are very young. A sure way of preventing their attack is to cover the vines with *mosquito netting*, covering the edges with soil to hold the netting in place. This should be done as soon as the vines can be seen, even before will be better, and should remain in place until the vines push for room.

Cucumber plants and melons usually have a hard fight with *aphis* in June. They work on the under side of the leaves which curl up and are difficult to spray. Spraying with *kerosene, tobacco dust, or whale-oil soap* will kill them. They are difficult to reach after once having a start, and the safest thing is to destroy all infested plants.

Late in the season the *squash, pumpkin, cantaloupe, cucumber, and watermelon* plants are likely to be attacked by the *cucumber-beetle.* The plants should be sprayed with pure *kerosene* in order that the bugs may be destroyed even though the gardening season is about over, for these little pests hibernate during the winter and will attack the plants in the spring as soon as they appear above the ground.

Many insects, such as the *asparagus-beetle, squash-bugs*, and a host of others, hibernate all

winter in rubbish or broken stems of weeds or plants, therefore all this rubbish should be burned as a precaution.

Bean anthracnose can be avoided by a careful selection of seed. If seed are saved only from perfectly healthy pods, which have no spots whatever on them, shelled by hand and put away carefully to avoid reinfection, in all probability a good crop will be produced.

To get rid of *bean blight*, pull up and burn all diseased plants. This is very difficult to control when it has once made headway.

Never plant beans on land which has grown beans the previous season. Plant another vegetable there instead. It will be safe to go back to that location the year following.

All *fungus diseases* should be sprayed with *Bordeaux mixture.*

Land that is badly infested with *white grubs* should not be plowed until late in the season, and no *corn, strawberries or potatoes* should be planted to feed them. A rotation of vegetables will be helpful in ridding the land of them.

Do not fail to destroy every *tent-caterpillar* you see. They multiply too rapidly to take chances with even one.

To kill *weevils in beans, peas, chestnuts,* etc., put the *legumes or nuts* in a barrel which has no cracks and pour over them a teacupful of *bisulphide of carbon.* Then cover tightly with a wet blanket or other woolen cloth for twenty-four hours. Do not breathe the fumes and be careful not to have fire or lights anywhere near.

The browntail moth is a white moth with a brown abdomen. It lays its eggs usually on the under side of the leaf during July, which hatch into *caterpillars* and do their damage the following spring. Four pounds of *arsenate of lead* to fifty gallons of water is an adequate spray for their death, and the trees should be sprayed in August soon after the eggs hatch and again when the leaves open.

Aphis, San José scale, apple-scab, and fly-speck disease of apples should be spread with a solution of *commercial lime-sulphur,* one gallon to eight gallons of water in the spring before the buds open and again in the fall after the leaves fall off. Persistency is the keynote of success in *spraying.*

Curculio, bud moth, tent-caterpillars, and canker worms should be killed by *spraying with arsenate of lead mixture.* The trees should be well sprayed before the blossoms open, if the spraying is to be effective without being harmful to the fruit.

Watch the apple trees closely during July for the maggot or railroad worm which does so much damage. It is especially bad in early apples and the sweet varieties of apples. About the only thing to do is to take off and destroy the infected fruit. Usually the infected ones will fall to the ground and they can be eaten by animals without harm. Trees that are kept well sprayed are not usually affected.

When apples are to be packed away for the winter, line the barrel or box with double layers of paper to keep them from becoming bruised when moved around. If not bruised there will be less danger of *rotting.*

An old worn-out *curry-comb is excellent for scraping dead bark and moss* from old trees.

When burying ashes near the roots of vegetables with the intent *to keep mice away,* see that the ashes do not come in direct contact with the stems and leaves.

Caterpillars had best be picked off by hand, or knocked into a pail of kerosene emulsion. If they are picked off, however, the chickens will enjoy the feast.

Ordinary table salt stirred into the ground near the plants which are attacked by the wireworm will be very effective in getting rid of these little pests. It should not be put close to the plant, however, or the plant, too, will succumb.

When the fruit trees are covered with a thick, hard scale, apply a solution of lime-sulphur water to the bark. This application should not be made while there are leaves on the trees as it is very strong and will injure tender foliage.

Wherever there is *stagnant water* there will surely be *mosquito larvæ*. So be sure to look into every empty tin can lying around, pour *kerosene* oil down the drains, sewer, into cisterns and pools, etc.

Ammonia or salt diluted with vinegar will allay the pain of *mosquito bites*.

A pile of rotting *straw* is a veritable hotbed for the multiplication of *fleas*, as it is also for *flies*.

Clear it away and sprinkle coarse salt over the spot. The fleas will immediately disperse.

Fleas may be trapped by sticky *fly paper.* A boy once caused the death of any number by tying sticky fly paper on his ankles and walking into the midst of a bed of fleas. They flew toward the moving object and met their death.

Ants abound on plants infested with aphis. They feed on the excrement of the aphis and they carry aphis from plant to plant To destroy ants will go a great way in getting rid of aphis

Drench ant colonies with boiling water; spray the lawn where they abound with *kerosene* emulsion, or with strong soapsuds made by dissolving any common laundry *soap* in a gallon of hot water. For large colonies *bisulphide of carbon* will be found effective. Squirt this into the nests by means of an oil can or syringe. After the bisulphide has been injected into the nest, close the entrance with earth. The fumes will permeate all of the nest and kill all the inmates. While bisulphide is perfectly harmless if kept away from fire, it is very inflammable and may explode if ignited. Plants that are affected by ants are not the attraction in themselves, but

the ants are attracted by sweet juices left there by plant *lice.*

The *house centipede* hides behind flowerpots, mops, and dirty rags which are stored in damp places. Fresh *pyrethum powder* in the closets, bathroom, cellar, conservatory, and other places where it frequents will soon rid the house of them. It feeds on *cockroaches*, the *typhoid fever fly*, and other harmful insects, but it is not an agreeable looking object to have around.

To control the *Hessian fly*, try burning all stubble and clearing all refuse from damp places.

To destroy the *small black fly* which feeds on the *pear and cherry trees*, spray the trees with *arsenate of lead* in water, in the proportion of two pounds of the poison to fifty gallons of water. If the application is not made until the fruit is well under way, it will be safer to use *white hellebore* instead of arsenate of lead.

The *fly* should be swatted before he becomes a fly. They breed readily in *manure* and the manure should be treated with *borax*, a heaping pint measure of borax to every eight bushels of manure. The borax should be applied with a flour sifter or other sieve and two or three gallons of water

should be sprinkled over the manure after it has been treated with the borax.

In sprinkling large quantites of *manure* with *borax* it should not be used in greater quantity than fifteen tons to the acre or damage to the *vegetables* to which the manure is applied may result.

Sprinkling *manure* with a solution of half a pound of powdered *hellebore* dissolved in ten gallons of water will destroy from eight-five to ninety per cent. of the *larvæ or maggots* which produce *flies.*

The army worm which can cause so much havoc in such a short period of time *is a smooth, striped caterpillar* about an inch and a quarter in length, and rather dark in appearance. The moth from which it hatches is brown with white spots on the wings. The most practical way to stop their progress in order to destroy them is to dig a furrow in front of their path and let them fall into it and pour kerosene on them. If they are already in a field, mix 1 lb. of *Paris green* with fifty pounds of wheat bran and the juice of half a dozen oranges. Mix this with molasses to form a dough and scatter it about. Do not let this be put where *children*

can get at it. The army worms breed usually in rank grass or over-fertilized fields.

Wasps may be destroyed by placing a gallon jug containing a quart of water near the nest. The wasps will fly angrily at the jug; the hollow sound of its buzzing echoing from the jug will make it enter the latter and fall into the water. Wasps call to each other, and where one goes the others follow. *Paris green* distributed on minced meat is poisonous to them, but this is a *deadly poison* to humans as well and should be carefully handled.

Spores and germs of diseases often are in the soil when it is plowed under, so use the precaution of raking up and burning all dead vines, etc. *Rotation is another means of checking the ravages of insects and diseases.*

The standard remedy for *San José scale* is *lime-sulphur*. If this cannot be procured at your dealer's, slake 22 lbs. of fresh lime, using just enough water to cover the lime. Add 17 lbs. of sulphur which has been mixed to a paste with water. Boil for an hour in 10 gallons of water, using an iron vessel. Add enough water to make 50 gallons and strain through wire netting.

Motor goggles should be worn when *spraying trees* or high *shrubbery* to protect the *eyes*, otherwise serious trouble may result.

When the *apple* blossoms begin to fall, the fruit grower should begin to *spray*. When the calyx lobes close a couple of weeks later, the spraying should stop.

The little brown slug that eats the foliage of *cherry, plum, and pear* trees in the summer time is not difficult to control. It can be destroyed by spraying with two ounces of *hellebore* in one gallon of water.

Pine-mice destroy fruit trees, attacking below the surface, and their deadly work is not discovered sometimes before the tree is dead. Bury a little *poisoned bran* (mixed with *Paris green*) near tree but not on the roots.

When a greenhouse has been infested with insects, all good plants should be taken out and the house thoroughly disinfected. Burning 6 ounces of sulphur to every 1000 cubic feet of space and keeping the house tightly closed for 24 hours will destroy any insects. Any plants infected should be destroyed, and this can be done by leaving them in the greenhouse when the disinfecting is being done.

Hydrocyanic gas is a most dangerous *fumigant* and should never be used except by experts.

Tobacco extract can be procured at almost any dealer's and *is safe and satisfactory to use as a disinfectant.* It should be burned once every spring in the greenhouse, as it is very effective in destroying plant lice. The plants should be taken out first.

A little mustard water composed of a teaspoonful of mustard to a quart of water will prove very efficacious *in killing various insects which feast on the leaves of vegetables.*

Blight, mildew, leaf-spot, and rust can be eradicated by the use of lime-sulphur, Bordeaux mixture and ammoniacal solution of copper carbonate.

Tree tanglefoot, wrapped and tied around the lower part of the trunk of a tree, *will catch and hold many crawling insects* which are making their way to the branches to eat the tender leaves.

When harmful worms are devastating the garden, pour a little limewater around the plants which they seem to attack most frequently. See that the water sinks into the earth. Later, you may need

to re-fertilize with liquid fertilizer, as lime tends to destroy the fertility of the soil.

A powder gun will be found a most convenient little article *when spraying with sulphur dust or other dry powders.* It will not be expensive and will last indefinitely.

An asbestos torch can be used to advantage when getting rid of caterpillars on high branches. It should be saturated with kerosene and held near the insects. The heat will kill the pests and will not destroy the trees.

Quails, tree-swallows, killdeers, robins, flickers, night-hawks, and pine-siskins are invaluable to the gardener. Among the *pests* which they eat for the farmer are:

Boll-weevils
Potato-bugs
Chinch-bugs
Plant lice
Olive scales
Mosquito larvæ
Grasshoppers
Beetles
Wasps
Caterpillars

A gentle slope toward the south or southeast is preferable for the garden, as it tends both to produce earlier crops and is likely to drain properly.

Even a fence will afford protection, however, against winds, and evergreens will do some good.

The surface of the garden should have no depressions into which the water will drain and stand. This will breed certain *pests*, *mosquitoes* among the number, and the vegetables near will be too moist with the possible result of rotting them.

The *toad* is the gardener's best friend. Never kill one. In three months he will devour 10,000 insects, among which are *beetles*, *worms*, *snails*, *spiders*, *grasshoppers*, *crickets*, *weevils*, *moths*, *caterpillars*, *wasps*, *yellow-jackets*, *ants*, and others. It never eats food without life. It can live two years without eating, but cannot live long under water, and it can lay more than a thousand eggs a year. Cultivate toads.

Angleworms do not harm plants. Instead they bring good soil to the surface and mix it with the other soil. They draw leaves, grass, etc., into their holes and make humus and when they die they fertilize the soil with their bodies. Robins would eat more fruit than they do now if they had not angleworms to feed on.

To protect tomato plants from the cutworm, wrap pieces of paper around the stem of the plant for about two inches below the soil and a slight distance above. Poisoned bran scattered on the ground near the plants will kill the cutworms. Be careful not to get it on the leaves of the plants.

Birds eat many of the harmful insects.

Insects are usually most prevalent on the young twigs of plants, and it is there the spraying should be most carefully done. To spray half-heartedly will do no good.

In spraying flowering trees or vegetables, be careful to get the mixture into the flower clusters. The spray should be directed from every angle.

Jack Frost is the champion *pest* eradicator.

Fall plowing with some *hens* following the plow is a good way *to get rid of many hibernating insects.*

Here is a list of *sprays* beneficial to plants and which every gardener should know how to make:

Bordeaux mixture:

Dissolve 4 lbs. of copper sulphate crystals in 2 gallons of hot water, using a wooden container,

or dissolve by suspending the crystals in a coarse sack in a half barrel of water.

Slake 4 lbs. of fresh lime in a wooden tub or half barrel, adding slowly just enough water to insure thorough slaking. When slaked, enough water may be added to make the mixture of the consistency of cream.

When cold, strain lime mixture through a wire strainer into the barrel and add enough water to make 25 gallons; dilute the copper solution with enough water to make 25 gallons and pour it slowly into the lime mixture.

Bordeaux Arsenate of Lead Mixture:

Mix 3 lbs. of lead arsenate powder with 50 gallons of Bordeaux mixture.

Self-Boiled Lime Sulphur:

Place 8 lbs. of fresh stone lime in a barrel and slake, using no more water than is necessary. As soon as the heat has generated, sift in 8 lbs. of sulphur flour and stir into the lime solution thoroughly, gradually adding more water to make a thick paste. Heat for fifteen minutes then cool by adding more water. Strain into a barrel and add enough water to make 50 gallons of the mixture.

Potassium Sulphide:

Dissolve 3 ounces of potassium sulphide in 10 gallons of water.

Corrosive Sublimate:

Dissolve 2 ozs. of corrosive sublimate in 15 gallons of water. (Very poisonous.)

Formaldehyde Solution:

For spraying potatoes, 1 lb. of formaldehyde to 30 gallons of water.

For onion smut, 1 lb. of formaldehyde to 16 gallons of water.

For seed bed, 1 lb. of formaldehyde for 12½ gallons of water.

Paris Green:

Slake ⅔ lb. of quick lime in enough water to answer the purpose; mix ⅓ lb. Paris green with a little water until it is of a creamy consistency, and add to the lime water; add enough water to make fifty gallons.

Arsenate of Lead Paste:

Dissolve 3 lbs. of arsenate of lead paste in 50 gallons of water.

Arsenate of Lead Powder:

Mix 1½ lbs. of arsenate of lead powder with enough water to make a creamy consistency and add enough water to make 50 gallons.

Hellebore:

Steep 2 ozs. of hellebore in a pint of water and gradually add more water until it amounts to 3 gallons.

Whale-Oil Soap:

Dissolve 2 lbs. of potash whale-oil soap in a gallon of water for use in the summer months; for winter use dissolve 1 lb. of soap.

Kerosene Emulsion:

Dissolve ½ lb. of good hard soap in a gallon of hot water. Chu this until it becomes thick, then mix with 2 gallons of kerosene.

FRUIT

APPLES

Deal only with reliable nurserymen. It takes six years before the apple tree from the nursery bears fruit, and in the meantime the nursery can change hands, or salesmen, and where can the blame be laid?

The use of *Bordeaux mixture on apples, pears, peaches, and quinces* has been generally discontinued owing to the danger to the foliage and fruit. It should never be used on peaches and plums in foliage, and *lime-sulphur* will be more satisfactory for all of these fruits.

Hardwood ashes make an excellent fertilizer for almost all fruit trees, and particularly for *apples, peaches, plums, and pears.* It should not be put up against the trunk but at a distance where the ends of the young roots will strike it.

Apples, pears, and quinces may be safely set out in the fall of the year, but the spring is by far the

best season for *peach and plum* trees, particularly in the North.

Dwarf apple trees are not very satisfactory. Their fruit is never any better and sometimes not as good, while the produce cannot be as great.

The heads of apple trees should be cut down in pruning in order to prevent their growing so tall that they cannot be successfully sprayed. When cutting, be sure to cut back to a healthy side branch to avoid leaving a stub.

Old apple trees badly in need of pruning should have about one-fourth of the wood removed in order to stimulate them to a more vigorous growth. This should be done while the trees are dormant, preferably a few weeks before growth starts in the spring. All dead, dying, and crossed branches should be cut.

Do all *grafting* on a mild day during showery weather, this should be in the spring when the sap begins to move in the stock. This does not occur as early in the apple and pear as it does in the cherry and plum. *The necessary tools* are a chisel, a thick-bladed knife, or a grafting iron with which to split open the stock after it is sawed off smoothly

with a fine-tooth saw, a hammer or a mallet to aid the splitting process, a very sharp knife to trim the scions, and a supply of good grafting wax.

As soon as the fruit has dropped from the apple trees, usually in June, *thin out the apples.* Each tree should be studied in order to leave a well balanced tree. Merely pulling off some of the apples will not serve the purpose, and *thinning* must be done properly if the fruit left is to be large, luscious apples.

It is a good practice to *thin the fruit from the bottom upward* as the fruit near the lower part of the trunk will naturally not get as much sunlight and air as the fruit nearer the top of the tree.

To rid an apple tree of the *codling moth and the apple worm,* spray with *arsenate of lead* within a week after the petals of the blossoms have fallen, and again two or three weeks later.

The gypsy moths hatch into *caterpillars* and do a great deal of damage to *apples.* All parts of the tree affected should be painted with creosote during the winter, and after the petals have fallen the tree should be sprayed with a solution of five pounds of arsenate of lead dissolved in fifty gallons of water.

Apples placed on open shelves in a cool, dark attic that is airy will keep longer than if placed in the average cellar, which often is too damp. Packed in clean, dry straw so they will not touch is also another excellent method for preserving them.

Young apple trees should be well pruned when planted, cutting back nearly a third of each branch. Pruning is a matter of great importance to young trees, and the trees will never do so well if they are not pruned when first set out.

The ground under the apple trees should be kept free from weeds and grass. The soil should be cultivated frequently for at least four years after planting the trees and cultivation twice a year should be given after that.

A mulch of leaves over the ground around the apple trees during the winter will be very beneficial. In the spring these leaves should be worked into the soil when cultivating.

Apple trees should be gone over carefully in the spring for grubworms. The ground close to the tree trunk should be dug up for five or six inches and search made for the worm and its larvae. Small holes will be detected where the worms have gone into the wood, and they can be removed by

means of a piece of wire or a knife, though in using a knife care should be taken not to scrape the trees badly.

An excellent fertilizer for the apple trees consists of five or six shovels of compost mixed with two pounds of muriate of potash. This quantity is sufficient for one tree.

When apple trees are planted in the spring, especially on light soils, the ground should be kept moist all the time. Mulching the surface with manure will help to conserve moisture and, if rains are not frequent, heavy drenching should be indulged in.

The top roots of apple trees should be not more than five inches under the surface. It is essential that the roots be not planted too deep. The soil should be firmly packed around the tree after planting and it should be a little higher around the base of the tree so that water will not stand in a stagnant pool.

Young apple trees should always be staked when set in the ground, just as older ones are. The limbs should be wrapped at a convenient place for tying a strong string or small rope, the rope tied around the wrapping, which may be of leather (pieces of

old shoe leather will answer) or of heavy cloth, and the other end of the rope carried to a stake driven in the ground several feet from the tree. Four stakes and four ropes will be sufficient for the average tree, but an exceptionally heavy-topped tree, which is more likely to be blown over by a strong wind, should have five or six.

Bitter rot and brown rot on apple trees should be sprayed with a mixture of ammoniacal copper carbonate and potassium sulphide, half an ounce to a gallon of water.

An insecticide consisting of a pound of caustic soap, ten ounces of soft soap, three-fourths of a pound of carbonate of potash, and ten gallons of water will be found very effective as a *spray for blight.* Leather gloves should be worn when handling this spray as it is injurious to the skin. This is a very strong spray and should not be used when the trees are in blossom or bearing fruit.

APRICOTS

Spring is the best time to set out apricot trees. The ground should be well manured before setting out the trees and the soil made quite heavy. A good garden loam will be very advisable.

Apricots should not have the most sunny location in the orchard, otherwise the blossoms will come too early and be nipped off by frost. The trees should be planted in a location where they will be shaded from the morning sun, preferably with a northern exposure.

Year-old apricot trees are preferable to older ones. The trees should be well pruned when set out and should be pruned regularly each year, but care should be taken not to cut the fruit buds. A little pruning goes a long way.

An application of ground bone-meal should be made around the apricot trees in the fall and a couple of weeks later potash should be applied. Nitrogenous fertilizers are not advisable. The trees are grown for fruit, not for foliage.

Apricots bear early and abundantly on short spur-like growths much more than on the new annual wood of the tree, so that after bearing age is attained little annual pruning is necessary though all dead or interfering limbs should be removed.

CHERRIES

A large stuffed *owl* will often prove to be a most effective scarecrow *for keeping the robins out of the*

cherry tree. If its position is changed every night, it will seem more realistic to the birds.

Cherry trees do not require as much pruning as other fruit-bearing trees. Merely cut out dead, broken, or "crossed" limbs.

Self-boiled *lime sulphur is a safe summer spray for the cherry trees* as there is danger of burning if a commercial solution is used.

The fruit of cherries, as a rule, is found on the old wood.

Sweet cherries need much more severe pruning than the sour cherries, and sweet cherries have a tendency to divide into shoots of nearly equal growth and thus form bad crotches which split easily, so great care must be exercised in the pruning.

Cherries require a well-drained, fairly deep loam. They will not thrive on dry, gravelly soil. A southern exposure is best to protect the young buds from extreme cold in the early spring.

In the very early spring there should be applied to each cherry tree a fertilizer composed of one part nitrate of soda, two parts of superphosphate, and

three parts of kainite. From two to three pounds of this mixture should be applied to each tree.

About the most troublesome enemy the cherry tree has is the cherry moth. It enters the fruit just as it is fertilized and remains there ten days or two weeks and causes the fruit to fall. It is a light brown color and has a dark band on the body and white edges on the wings. It appears to be standing on its head when sucking the fruit. All fallen fruit should be burned. It is dangerous to apply any poisonous spray or the fruit will be harmed. The eggs are often laid in the summer and not hatched until the following spring, and sprays may safely be applied in the fall. Lime-sulphur is safe and advisable.

The cherry orchard should be elevated, as free circulation of air is necessary to prevent the fruit from rotting. A low, damp place will not produce fruit.

Cherry trees need little pruning unless the limbs are afflicted with some disease. They should be branched low, otherwise they will attain a great height and the fruit will be difficult to pick. *The soil should not be too rich* or the trees will crack and burst.

Cherry trees need little cultivation after the first two years. The grass around them should be cut and left on the ground to make humus. When there is no grass growing near the trees, a mulch of leaves or grass should be supplied.

Cultivation of cherry trees should not be deeper than three inches or there will be great danger of injuring the roots.

In picking cherries, never break off the slender spurs upon which the fruit is borne. To do so will cause a decrease in the quantity of fruit of at least one-fourth.

Potash and phosphate should be applied to the cherry trees in order *to produce large and luscious fruit.* Three or four pounds applied to the tree once a year, preferably in the fall, will be a sufficient dose.

FIGS

The fig tree is another fruit tree peculiarly adapted for a warm climate, and even in the South it *should be protected from the north winds* by being placed in a location having a protection on the north, and it should be fully exposed to the sun throughout the day.

The roots of fig trees should not be permitted to spread at will. A very good plan is to make an underground wall of bricks or cement for confining the roots to a limited space. Rank growth will produce poor fruit.

Fig trees should have a well drained soil and plenty of humus should be supplied them.

Figs should be picked immediately after ripening. They will quickly turn sour if left on the tree and a horde of insects will be after them. Figs for preserving should be picked just before they are ready to eat. Ripe figs will not last more than twenty-four hours after ripening.

In pruning fig trees, cut off about two inches of new shoots. The fruits mature principally on wood from a year to two years old. The branches should not be permitted to overcrowd one another, one shoot for every four or five inches of branch is quite enough.

Mealy-bug on fig trees should be guarded against by brushing the branches and shoots with a hard, stiff-bristled brush, dipped in kerosene emulsion. *When canker attacks the trees*, coat all wounds with tar as a preventive of infection.

A mouse trap is a very convenient thing to have *setting around the fig tree*, for mice are apt to steal out and enjoy themselves on the best of the fruit unless some provision is made for trapping them.

MULBERRY

The mulberry tree is easily grown in ordinary garden soil. This is a not uncommon tree in the far South, but people of the Northern States are denied the pleasure of this delicious little fruit.

Grass growing under the mulberry trees should be kept cut close to the ground during the fruiting season or the small fruit will be difficult to find after it has dropped. Mulberries should always remain on the tree until thoroughly ripened.

The mulberry is easily propagated by cuttings, which will take root readily when planted in rather moist soil exposed to the sun for the sufficient amount of heat.

In pruning the mulberry tree remove only enough branches to prevent the tree from becoming overcrowded with shoots. To cut back to four or five buds will be sufficient. To prune more deeply than this will result in a loss of a great deal of fruit.

PEACHES

When the "June drop" is over and before the pits harden is ***the right time to thin peaches on trees that are heavily laden,*** and to produce fine large peaches, a heavily laden tree should always be thinned. A limb should not be permitted to hang downward heavy with fruit or the peaches will be small and not very luscious.

Peach pits, plum stones, and stones of other fruit should never be permitted to dry out thoroughly if they are to be saved for seed. They should be taken from very ripe fruit, carefully packed in a box of moist soil, and kept in a dark place until October, the natural planting time, as they will then have all winter in which to germinate and sprout ready for the spring.

Peaches should be picked when they are mature and before they begin to soften. They should be handled very carefully in order not to bruise them if they are to be kept for any length of time.

Spraying for *peaches affected with leaf-curl and San José scale* should be done in the spring with *lime sulphur;* for *brown rot, scab,* leaf spot, and *curculio,* just after the blossoms fall, with lime

sulphur, to which a pound of *arsenate* powder has been added, and again two weeks afterward.

When a peach tree has brown rot all mummies left on the ground should be carefully gathered and burned to prevent the spread of the trouble.

Commercial lime sulphur is likely to burn the foliage if it is used on *peach trees in summer* and should be diluted in the proportion of one part water to one hundred and fifty parts of lime sulphur before using.

Examine all trees carefully before planting and if there are *black, gall-like growths on twigs* and branches the trees *have black knot.* These knots should be cut off and burned during the cold days, using care to remove several inches below the affected part.

When large limbs of peach trees are affected with black knot it may be well to try spraying with lime sulphur before deciding to cut them off, and then painting the surface with several coats of good lead paint. If this fails, they should be removed in order to save the rest of the tree. This applies also to other fruit trees, such as plum and cherry.

Plant lice on peach, cherry, and plum trees should be sprayed with a solution of *nicotine sulphate*, adding about three pounds of soap to every one hundred gallons of nicotine to make it stick better. After the leaves curl no successful treatment is possible.

Peach trees afflicted with the peach borer should be treated by first cutting out, or digging out with a wire, the obnoxious insects and spraying with lime sulphur. This should be done in October and again in May as some of the small ones may have been overlooked in the fall. In cases where it is practicable, the earth may be mounded up about a foot high around the trunks in June and removing it in September as a protection. There are patented protectors to be bought for this purpose.

In pruning peach trees, three or four main branches should be left at the end of the first season, which should be shortened to about a foot in length and allowed to divide into three or four branches during the next season's growth. The more rapid the growth of new wood, the nearer the tips the fruit buds will be found, hence it is a mistake to prune this fruit too soon.

To thin out fruit on the peach tree, cut the fruiting wood out instead of taking off the peaches or the blossoms. The best fruit will grow nearest the ground. Trees should be allowed to spread out rather than to grow tall, and this is accomplished by the pruning.

A peach is best when fully ripened on the tree, so that it is just ready to drop. Peaches picked green are not fit for eating, and even when cooked will lack the delicate flavor which they should have.

When scale attacks the peach trees, spray with kerosene emulsion, making the application with a stiff brush so as to remove as many insects as possible at the time. All fallen leaves should be burned.

Peach leaf curl causes ugly blisters on the leaves and curls them up at the edges. A reliable remedy has not yet been discovered, but the location has been proven to be of importance. Cold winds have been found to coincide with this trouble and protection should be given. Spraying, just when the leaf buds begin to open, with ammoniacal solution of copper carbonate will aid by rendering the tree immune from infection by wind-borne spores from neighboring trees.

PEARS

Pears will grow on almost any soil if it has a fairly good drainage. The best soil is a clay loam, and an abundance of warmth and sunshine should be supplied for the finest fruits. Exposure on the north and east will go far toward producing early fruit.

To prevent the spread of pear blight, remove the blighted twigs as soon as they appear and burn them, first having sterilized the pruning implements. Sterilize the implements again after cutting the blighted twigs to prevent other trees being affected; spray with lime sulphate as is done for peach trees affected with leaf curl, etc., and do not fertilize the trees too heavily with nitrogenous fertilizer or barnyard manure. The ranker the growth of the tree the worse the blight.

Injury to the bark of pear trees by climbing up on them, by a blow from a cultivator, or by breaking the twigs and branches with a ladder *often causes blight.*

Be sure to have *late and early bearers among the pear trees.* Some of the most reliable are Le Conte, Bartlett, and Russets.

Slow growth favors fruitfulness in pear trees, and the pruning process should consist in thinning out the top, or newer, branches to permit light and air to get at the lower branches of the tree which should never be removed if healthy.

The fall of the year is *the best season for planting pear trees*, and if not planted until spring the work should be done before growth has started. The top roots of the trees should not be more than four inches under the surface, and the trees should be staked to prevent a strong wind blowing them over.

The young fruit on pear trees should be pruned if large, luscious pears are to be produced. Fruits should never be allowed to touch each other, and the early fruit should be gathered before it is quite ready to drop and ripened off the tree in a cool room kept at a uniform temperature.

In storing choice pears, do not let them touch one another.

Choice fruit can be protected from flies, bugs, etc., while on the tree by placing over each fruit a thin muslin bag. The sun can shine through these bags, and the fruit will not be deprived of the necessary ripening elements though protected.

A surface-soil dressing of kainit or of bisulphide of carbon in the spring will *prevent attacks from gnats, sawflies,* and several other insects. All fruit which is later injured should be burned immediately before the pests have a chance to multiply.

Certain varieties of pears are subject to rot at the core if left on the tree until ripe, and the flavor is seldom as good in pears of any variety which ripen on the tree. *The time to pick pears is when they begin to take on a yellow tinge.*

When picking pears for ripening indoors, wrap each one in a piece of thin, soft paper, and lay away in a cool, dark drawer on a piece of cotton. The paper will keep them from touching and will absorb moisture which would otherwise cause them to rot.

PLUMS

A rich clay soil is best suited for the plum. The ground should have an application of compost every year, and cultivation for the first two or three years should be regular and constant.

Several varieties of plums planted together will

insure pollination and be the means of producing much finer fruit.

To let the *chickens* have the run of the plum orchard *will be very helpful in getting rid of insects* which attack the fruit. Many insects bury themselves in fallen fruit and later attack fresh fruit.

A plum much to be desired for making jelly is the small yellow plum grown so extensively in very warm climates. This plum is very acidulous, hence the jelly-making quality. In many parts of the country, however, it is not known, but it would pay anyone who is cultivating plums to find out about it and plant several trees.

Plum-tree cuttings are easily rooted by placing them in a glass jar half filled with sand, and enough water to cover it for more than an inch. When the roots have attained a good strong growth, the sand should be poured into the center of a pot of earth and the cutting placed therein. This will give the cutting much the same soil condition it has been having.

When the green fly attacks the plum trees, spray with a diluted solution of kerosene emulsion and cleanse as thoroughly as possible with the fingers,

though this, of course, is impossible where a number of trees must be cared for.

Damsons, or damson plums, are grown in the same manner as plums, and any method of treatment applied to one will work effectively for the other.

QUINCES

The quince requires for its best growth a moist, rich soil, though not over-rich. If it gets plenty of water, it will not require much attention, and it lives to be a very old tree. Liberal cultivation, however, will be rewarded.

Cuttings from a quince tree can be rooted by placing them in wet sand, later transferring sand and cuttings to a pot for a year or two before setting in the open ground. The fall of the year is the best time for removing these cuttings from the main branch, and several joints should be buried in the sand for rooting purposes.

Quince trees should not be set closer together than ten or twelve feet, as the trees are usually grown in bush form in order to produce the greatest quantity of fruit.

Quince trees should be set out in the spring and the ground should be well mulched with leaves or grass. Borers should be searched for at the time of setting the trees out, in order that they may not get a start on the young trees before they are detected.

Nitrate of soda and bonemeal in equal quantities dug into the earth *around the quince trees* will prove to be very beneficial.

MISCELLANEOUS

When sugar is too high priced to preserve fruit, then dry it. *Dried fruit is very satisfactory in the dead of winter* and can be utilized for pies and other dishes as well as any preserved fruit. The late fruit can be dried effectively by placing it on the radiators part of the time though the sun's rays should do some of the drying.

There are orchards dying from lack of air. The surface soil is so hard and compact that the roots are smothered. Remember that your trees need to breathe as well as the smaller plants, or you.

If whitewash is applied to the trunks of old trees to prevent injurious insects from hibernating, it is

a good plan to remove all the old rough bark first. A rough rasp or file is a good instrument to use.

Large vegetables should not be planted near a tree. Give the tree a chance. Orchards should not be plowed deeper than three or four inches or the young roots will be destroyed.

Before deep snow comes look at the sawdust piles at the root of the tree and see *where the borers have been at work.* This is the time to go after them with a knife and a wire.

In the fall is the time to take scions for the next season's grafting. Take them from the tips of the limbs that made a good growth during the past summer and bury them in sand or earth in the cellar where they will be cool and moist but not wet.

Don't experiment on everything an agent has to sell for trees. Have products analyzed before you take a chance with your fruit. There are good standard *remedies for most insects and diseases* which already have been tried out.

Ground bone is excellent for fruit trees. Four hundred pounds to the acre is what one very

successful fruit grower has recommended; one tree will require very little.

When the strongest limbs all grow in one direction, making the tree one-sided, they should be pinched back and thus give the trees a start, by encouraging other limbs to grow on the other side. Judgment should always be used in pruning.

Harrow the orchards after the rains and before a hard crust forms if you would get the best results.

Winter pruning tends to produce wood, while summer pruning has a tendency to promote fruit-bud formation. Plants cut in the summer have power to adjust themselves, while plants which are pruned in the winter have expended all their energy. Wounds made in the summer heal rapidly.

Fruit trees should not be set too close together for two very good reasons, *i. e.*, the roots will not receive the proper amount of nourishment and insects can more easily spread.

TABLE DENOTING THE DISTANCE AT WHICH FRUIT TREES SHOULD BE SET

Apples (dwarf size)	10 feet each way
Apples (standard size)	25 to 35 " " "

TABLE DENOTING THE DISTANCE AT WHICH FRUIT TREES SHOULD BE SET (*Continued*)

Apricots	16	to	18	feet	each	way
Blackberries	6	"	7	"	"	"
Cherries	16	"	20	"	"	"
Currants	3	"	4	"	"	"
Gooseberries	3	"	4	"	"	"
Grapes	8	"	12	"	"	"
Nectarines	16	"	18	"	"	"
Peaches	16	"	20	"	"	"
Pears (dwarf size)			10	"	"	"
Pears (standard size)	16	"	20	"	"	"
Plums	16	"	20	"	"	"
Quinces	16	"	18	"	"	"
Raspberries	3	"	5	"	"	"

SMALL FRUITS

BLACKBERRIES AND RASPBERRIES

Blackberries and raspberries require a rather damp soil in order to produce the finest berries. While the soil need not necessarily be very rich, it should not be lacking in fertilization if large berries are desired. Good drainage should be supplied.

Manure should be applied to the blackberry and raspberry patches in the fall and should be worked into the soil to a depth of two feet. During dry weather the ground should be kept loose by frequent cultivation.

Raspberries and blackberries require practically the same treatment, hence they are nearly always grouped together and treated as one fruit.

Blackberries are rampant growers and require plenty of room. They also require careful pinching and pruning to secure the best results. The young shoots should be pruned when they are from three to four feet long.

In severe climates it is best to cover the blackberry and raspberry bushes to protect them from freezing. In warm climates they will need no winter care as only very old and well-ripened wood will be affected by the cold.

A raspberry patch ceases to be profitable after about four years and a rotation should be practised.

Raspberries should be planted in the spring when the soil can readily be worked.

Strong young plants are more satisfactory than older plants and should be set in rows four feet apart and the plants be set four feet from each other in the row.

Raspberries and blackberries both bear fruit on short shoots which have grown from canes of the previous year.

Crown gall is a bacterial disease which causes tumor-like growths on the raspberry plants. Diseased plants should be pulled up and destroyed before the disease can spread to the other plants as *there is no known remedy.*

Cultivation of the raspberry and the blackberry should begin early in the spring and be continued

from one to two weeks apart throughout the season in order *to provide a dust mulch.*

All canes that have fruited should be cut off in the fall. *All winter-killed canes* should be pruned in the spring, and the remaining canes shortened to three or four feet, and at least a third of each long side-shoot cut off.

When the new growth of raspberries bends over on the ground it is *time to "tip" the canes.* Each tip should be buried a few inches in the ground and held in place with a peg, a stone, or a clump of dirt. In the spring the tips will have roots and the new plants can be severed from the old.

All raspberry and blackberry canes should be cut off and burned *immediately after fruiting.*

The tips of new canes should be nipped off when they are four feet high.

All canes should be cut back to about three feet in the spring.

Only five or six of the strongest canes should be left to each raspberry.

Raspberries require a rich *loam.*

All suckers should be removed not later than the first of June.

Supports enable the berries to be picked easily and *prevent sand getting into the fruit.*

Purple cane and black-cap raspberries may be forced for laterals but this treatment is severe for the red raspberry and they are likely to succumb to the cold if this is done.

The blackberry is a native of the shady, damp woods, and will not thrive on hot, dry plains.

The land intended for blackberries should previously to planting have been cultivated a couple of years, at least, or the blackberries will be stubby and not very luscious.

The blackberry requires careful and constant pruning. The canes should be permitted to grow undisturbed the first year. The second year the canes should be cut off when from two to three feet long. They will then start to branch.

If the blackberry bushes are not thriving, try snipping off the tips to prevent the canes growing too long, and re-fertilize.

Ordinarily four to six canes are all that a blackberry bush can support with ease and comfort; all

the others should be cut off or they will weaken the productiveness of the plant.

Blackberries are about the cheapest dessert, requiring no cream, which would really spoil the berry, and very little sugar.

After blackberries have fruited, *the canes which have borne fruit* should be cut off and burned, for their mission has been fulfilled and the space which they occupy is needed for the new canes.

Five to seven canes should be left for the next year's fruit when pruning blackberries.

All broken and diseased canes should be taken from the blackberry bushes in the spring just after growth starts and the tips of all branches which have been injured by the cold should be removed.

A site for the blackberry vines is of the utmost importance, and the moisture of the soil is an important consideration. *The best land* is a deep, fine, sandy loam with a large supply of humus and abundant moisture at the ripening season. The berries will then be large and luscious. If water stands on the ground surrounding them during the winter the plants are often killed.

Tender varieties of blackberries may be bent down along the row and covered with an earthen blanket *for winter protection in severe climates.* If a little soil is removed from one side of the roots, canes will bend down easier; if necessary they can be held in place with wooden pegs.

Blackberry bushes that are infected with red-rust should be dug out and burned. This is the only way to treat this dangerous fungous disease.

Blackberries, red raspberries, and currants may be set in the fall and a shovelful of manure banked around each plant *to protect them from the cold.* If manure cannot be procured, the soil may be banked up around the plants when set, and then levelled off in the spring. Manure is far more heating than plain earth, however, and is well worth the trouble of procuring.

Too much hot sun causes blackberries, which have been picked, to turn a very undesirable reddish shade. They should be put in the shade as soon as possible after picking and kept cool.

There are one hundred and forty different varieties of blackberries recognized now. They are divided into three classes: the hardy, the half hardy, and the tender. The hardy varieties should

be able to stand a temperature of thirty degrees Fahrenheit and should not be affected by a sudden change of temperature.

BLUEBERRIES

Blueberries are far more delicious than the blackberry or dewberry, and preferred by many people to the strawberry or raspberry. Now that so much is known with regard to their demands in cultivation, it is becoming more and more a cultivated plant. *Blueberry bushes thrive best in soils that are too acid for other plants.* Leaf peat and sand form an excellent combination.

The blueberry plant has on its roots a very minute fungus which cannot be detected without the aid of a microscope. This fungus furnishes nitrogenous food to the plant which nourishes it and makes it thrive.

Blueberry bushes under favorable conditions *will live for fifty years.* Cold stimulates the growth of the plant and stems that are not exposed to the cold will be dormant when spring comes whether they are nourished or not.

Blueberries require cross pollination. Berries self-pollinated or pollinated from other pollen

on the same bush will be very inferior in size and flavor if they mature at all.

Blueberries picked from a number of bushes and mixed will have a far more delicious flavor than the berries from one bush only. The flavor varies in berries from different bushes, some being more acid than others.

CURRANTS AND GOOSEBERRIES

Currants and gooseberries are two of the hardiest of fruits and yield excellent results for the time given them, yet they are not cultivated very extensively. Currants stand at the head of most fruits as a jelly foundation.

In the case of both currants and gooseberries the fruits are produced on both old and new wood; the fruit appears as auxiliary growths from the shoot itself and wood three years or more of age is unprofitable and should be cut away.

Currants and gooseberries can remain on the bushes a much longer time than most fruits without deteriorating—even as long as three weeks.

Currants and gooseberries should be pruned in the spring. Two or three main branches of the cur-

rant should be removed each time and three or four of the gooseberry. All canes bent to or near the ground should be removed.

Currants and gooseberries root near the surface, therefore *deep plowing or cultivating is unwise* in their case.

As soon as the leaves start on currant and gooseberry bushes, *all sickly looking or non-starting canes should be cut out* and burned promptly. *Borers are probably within* and in this way they can be kept in check and not allowed to get at bushes that are not already infected.

The most serious pest of both the currant and the gooseberry is the *currant-worm.* If it is sprayed at the first appearance with hellebore it can be readily controlled. Watch for the second brood.

Before severe weather sets in, the currant branches should be drawn together and tied to prevent their being broken by the winter's snow or sleet.

The English varieties of gooseberries are more highly susceptible to mildew than our native berries, but where they can be grown successfully they are highly appreciated on account of their coloring.

Gooseberries should be thoroughly ripe in order to be appreciated.

A deep, rich, moist soil is required to produce a fine crop of *gooseberries and currants*, though currants can be grown on almost any kind of land.

Many experienced growers prefer to plant the *gooseberry* in the field or orchard where it can *have partial shade*, and this is to be recommended if the grower is willing to give thorough cultivation to both berries and trees.

Deep fall plowing is recommended for currants in order to store up all the rainfall during the winter and spring. The planting should be as early in the spring as possible, and *the bushes should be set five feet apart each way. One year old plants* from cuttings should be used.

New shoots on currants and gooseberries should be nipped back in the summer *to induce branching.*

DEWBERRIES

Dewberries are more satisfactory if allowed to ramble on the ground instead of being trained on a trellis or other support.

To plant dewberries in hills, five by five is the most satisfactory method. Clean and thorough cultivation is necessary.

The same soil conditions that prove satisfactory for blackberries and raspberries will answer for dewberries. The cultivation is practically the same, the dewberry differing from the blackberry principally in its trailing habit. The fruit comes earlier and is often called early blackberries.

GOOSEBERRIES

(See "Currants and Gooseberries.")

GRAPES

Grape cuttings can be taken from the largest and best developed vines of the previous season's growth. Each cutting should have at least two buds and should be about eight inches in length. Cuttings should be made as early as possible and packed in the cellar in moss or damp sand until planting time in the spring.

To prevent rot, wormy grapes, and other troubles, spray the grapevines with Bordeaux arsenate of lead mixture, the first application soon after the

fruit sets, the second ten days later, and the third from ten days to two weeks after the second spraying.

Paper bags placed on bunches of grapes, when the grapes are the size of shot, and left there until harvest time will *prevent wasps, yellow jackets, and birds from puncturing the grapes.* Bees will not feast on the juices *until* punctures are made.

Do not fail to *utilize all available fence space,* summer houses, etc., *for your grapevines.* Vines not only beautify but provide food as well.

Grapevines will not be harmed by planting other small fruit, etc., among them, such as currants, strawberries, small vegetables, and flowers.

The last of February or the first of March is the *best season for pruning grapevines* in the Northern States, while the work may be done in the South a month earlier.

Grapes grow upon shoots which grew the year before. Usually each bud left on canes a year old will produce a shoot.

The shoots which come from short-jointed canes are *the fruit-bearers.*

There is always a reason for *poor fruit and dejected looking vines*. Find out what it is.

Grapes do not need *pruning the first year*, except to remove all but two or three of the strongest shoots. *The second season* all of the canes but one should be removed. *The third year* the vine is pruned for form.

That part of the vine which is to bear fruit is best located near the root.

When vines are attacked by insects that do not yield to spraying, they should be heavily pruned.

Vines growing on heavy rich soil do not need as much pruning as those growing on light or sandy soil.

As a rule the more pruning the *more fruit*.

When only a few vines are to be sprayed cover the bunches of grapes beforehand and they will not be harmed by the spray should it be harmful to the fruit. When the nature of the spray is not known, some protection should always be used. Light-weight tin cans will serve well when the right size is used.

When a thaw comes the grapevines should be looked after, and all posts should be straightened, wires tightened, vines tied up, and refuse *burned.*

Sixty buds on the bearing wood of a grapevine are *the maximum usually for a strong healthy vine.* When vines are small and weak they should not be allowed to grow to maturity many bunches of grapes. Sixty buds will produce one hundred and fifty bunches of grapes.

To prevent rot, wormy grapes, and other troubles, such as insects, spray the grapevine with Bordeaux arsenate of lead mixture soon after the fruit sets, repeating the operation about ten days later and still again two weeks after the second spraying.

To preserve grapes for winter use, seal the ends of the stems with paraffin or sealing wax and hang them in a dark cellar or in any room where the air is not dry enough to wither them, nor cold enough to freeze them. Fasten each bunch separately so it will not touch another bunch.

A mixture of the *dried blood of cattle and crushed bonemeal* is excellent *for the grapevines, strawberries*, and other vines.

If you want a vine vocabulary be sure to memorize the following terms:

A shoot is a growth only a few months old.

A cane is a shoot from one to two years old.

An arm is a cane more than two years old.

A sucker is a growth starting from the root or trunk below the ground.

A branch connects the arms with the trunk.

The trunk is that part of the vine between the roots and the branches. It is sometimes called *the stem.*

A spur is a cane which has been pruned to less than five buds.

A water sprout or "bull cane" starts above the ground from wood more than a year old.

Laterals are shoots which start from shoots.

LOGANBERRIES

Loganberries require an abundance of moisture if they are to give good results. Where the soil and climatic conditions are favorable they will

produce berries two inches in length. They should be cultivated in the same way that blackberries are cared for, and should be supported by a trellis.

RASPBERRIES

(See "Blackberries and Raspberries.")

STRAWBERRIES

Strawberries thrive best on a rich sandy loam, though they can be grown in almost any soil. Plenty of moisture and thorough draining are necessary.

Manure should be applied to the strawberry bed in the fall and should be plowed under eight or ten inches. A second plowing should be given in the spring.

Rows for strawberries should be three or four feet apart and plants should be about a foot and a half from each other.

Set out only the best varieties of strawberries. None others are worth the time spent on them.

If there are different grades of plants among those to be set out, alternate the good with the poor.

Prune all runners the first season if you would produce the finest fruit.

Purchase both pistillate and staminate vines and alternate in planting. This insures *good fertilization.*

Plants should be set out toward evening in moist soil that they may have all night in which to recuperate from transplanting before the sun's rays fall on them.

The roots of plants should be kept in a pail of water until ready to put into the ground, when they should be planted with the roots spread out. Never crowd the roots.

When the ground freezes the first time for the season, mulch well.

The spring strawberry bed should be cultivated regularly and often. Keep the soil loose and mellow and let no weeds get a start.

The hill system of cultivating strawberries differs from the old system, in that no runners are allowed to flourish.

All blossoms should be picked from newly set-out plants that are for spring bearing. All the strength should go into the plant in order to produce the finest fruit.

Crowded plants mean *a poor crop.*

The strawberry bed should be mulched early that the plants may get a good start.

Do not put *a new strawberry bed* on land that has been in sod within two years, or there may be *a crop of white grubs.*

Strawberry mulch should be three or four inches deep in order *to prevent freezing.*

If the strawberry bed is in an exposed place, where it is subject to heavy winds, place boards, poles, or brush on the mulch to hold it in place. This is impractical, of course, on an extremely large bed.

A full crop will not result from a late bed.

In picking strawberries there should be two pickers, one on each side to save stepping over the plants and injuring them.

Plants more than a year old do not as a rule produce a large yield. Plants more than two years are not worth cultivating.

The worn-out strawberry bed should be plowed up for some late vegetable crop as soon as it has fruited.

Throw all *surplus mulch* into the aisles. It retains moisture.

To can strawberries so that they will not lose their shape, place them in jars with alternate layers of sugar; keep them in a cool place overnight, then put them into a hot syrup of sugar and water, let them boil up gently, put into cans, and seal.

To prevent strawberries and raspberries from losing their color when canned, place brown paper bags over the jars when setting up.

Hard-wood ashes used in connection with well-rotted stable manure *make an excellent fertilizer for the strawberry bed.* Ashes provide potash which is much appreciated by the strawberry plants.

GENERAL

All the small fruits, i. e., berries, require a well-drained loamy soil. Heavy clay or adobe soil will grow these fruits, but the best results are obtained on soils that are more open and porous.

New land should not be planted to small fruits. At least two years should be allowed to subdue the land, meanwhile growing such crops as will require deep cultivation and much moisture. The land should then be plowed to a depth of at least ten inches and cross-plowed in the spring and thoroughly pulverized. Poor preparation of the land is often the cause of failure to produce good fruit.

During the first year small vegetables, such as cabbage and potatoes, *may be planted among the berries,* but not corn or other grain. The second year, and thereafter, the berries will require all the space themselves.

See what pleasure you can get out of *the production of new forms by grafting and cross-pollination.* It will lend a new zest to the cultivation of berries to cross them and experiment in various ways.

Don't spoil fresh berries by cooking them. The next best thing to eating them raw is to preserve them for winter, when fresh ones cannot be procured.

If a heavy load of snow or ice comes on the berry bushes and shrubbery, go around and knock off what you can with a pole. It may save them from

breaking down. The careful culturist keeps an eye on his fruit all the time.

Some little furrows or ditches may be needed to facilitate drainage in the berry patch in the winter, even though there are tile drains. *When ground is frozen*, water cannot get into underground drains.

Here are two methods of *keeping the birds away from berries:* (1) Get some pieces of bright tin and so hang them that they will flap in the wind against a pole—10 x 12 inches is a good size; (2) cover the bushes with one-inch fish netting. Scarecrows and strings often fail, but fish netting is sure and not at all expensive for small areas.

Keep berries in a cool place after they have been picked, and spread out over wide area, if possible, in order to let the air circulate through them. *Berries will keep twice as long* if they are thus cared for.

If the bones from the table are soaked in water for a few days and this water poured around the *berry vines*, the vines will *receive a great deal of nourishment.*

NUTS

CHESTNUTS

Chestnuts do not require much attention. Given a light, well-drained soil, and plenty of sunlight, they will continue to grow and thrive for two or three generations. Soil that will not produce other fruits may be used profitably in growing chestnuts.

Chestnut trees bear fruit when from five to ten years old, and even before they are ready to bear they make splendid shade trees for the home grounds. Since the trees grow to be so large, it is not advisable to plant more than one in a small space.

A good way to start chestnut trees is from suckers rooted in pots. By putting the slips in pots the tap roots can be controlled and the young trees can gradually be brought to outdoor life by setting the pots in the soil out of doors in locations where they can be protected.

Nearly all nut trees require a very rich, friable soil to a depth of several feet in order to produce fine large nuts.

WALNUTS

English walnut trees are very beautiful with their glossy, green leaves. They are very clean and make splendid shade trees. *Rich, well-drained soil is best suited to their requirements*, and when the trees are once started, they will not call for very much attention.

English walnuts should be planted in the fall The sprouts will not grow very much during the first two or three years, and should be transplanted during this time, before they have begun rapid growth.

Many walnut trees bear as much as eighteen bushels of nuts each year. The trees should not be set too close together, forty feet not being too much space between them. This space can be utilized for small garden crops and there will be no disadvantage to the tree.

The late winter months is the best season for pruning walnut trees, just before the sap begins to rise.

The lower branches only need be cut off, and after the trees are eight or ten feet high, no pruning will be necessary except to cut away bad limbs.

English walnuts will bear within five or six years after seed are planted, but trees that are transplanted nearly always require three or four years after transplanting, regardless of the true age of the tree. *Trees planted in groups bear earlier than a single tree,* as pollination is more likely to take place early.

The black walnut will produce finer nuts if it stands near a pool or stream of water, as the roots want a great deal of moisture. It usually requires ten years from the planting of the seed before it will bear nuts.

TREES

Before planting a tree, outline the surrounding area. Note carefully the proximity of other trees, nearness to a dwelling, what small vegetables are to be grown near, etc. The tree is planted for a long period, and the surface immediately surrounding it will not be found very useful owing to the lack of sunlight caused by the branches of the tree.

The fall of the year is the best time to plant trees and large bushes. As much earth as is possible should be left clinging to the roots, and the hole in which the tree is planted should be half full of water at the time the tree is set in it.

When the bark on fruit trees has become hard it should be softened by washing it with a solution of strong soapsuds, or concentrated lye dissolved in water. *An application of whitewash is excellent for softening the bark of trees and for keeping insects away.*

When watering trees or plants with very deep roots, a piece of pipe an inch or so in diameter should be driven into the ground near the roots and the water poured down it.

A young tree should always be planted several inches deeper in new surroundings than it has stood in its former position. If it has attained a growth of more than six feet, it should be generously pruned before taking it up. To prune it before taking it up makes it easier to handle, and as the tree is then firmly set in the ground it is not so likely to be pulled to a crooked position in the cutting.

Train the fruit trees to a pretty shape. There must be some pruning and it might as well be done systematically.

When trees have been out of the ground some time before transplanting, the roots should be soaked for a day and a night in water. They should be kept cool, if possible, but at any rate should not be allowed to lie in the sun.

MISCELLANEOUS HINTS

In planning the garden, remember that there should be some sort of safeguard against rabbits and poultry. A tight board fence will accomplish this and will also serve as a windbreak for the tender vegetables. A wire fence of close mesh will answer if it is put up carefully.

To place the garden near a running stream may be a convenience in watering, but be sure that this is not a stream that overflows during the growing season, or you may wake up some morning to find your carefully planted garden flooded.

Fresh vegetables from the home garden are not subjected to exposure on the markets or in transportation *and are not liable to become infected* in any way. Many garden products lose their flavor if not used within a few hours of gathering.

Practically all of our vegetables consist of over eighty per cent. water and some have almost ninety-

five per cent. water. The quality of the vegetable is dependable upon this supply of moisture, therefore when moisture is denied to them while growing they will be poor in quality and flavor, as well as having their growth stunted.

Land that is too wet for crops and which is not easily drained should be plowed during a very dry period, harrowed thoroughly, and planted with seed to redtop (herd's grass) and alsike clover. This will entirely change the quality of the soil and the next time crops are planted a distinct improvement will be noted.

It has been estimated that a well-kept garden will yield a return fifteen times greater than would the same area devoted to general farm crops. A half-acre of land will supply at least a hundred dollars' worth of vegetables during the season, while the average return for farm crops is less than one tenth of this amount.

In laying drain do not make the mistake of putting down tile too small to carry off the water when at flood-tide.

It may make the muscles sore and the back ache to *dig out briers and pull up weeds*, but this is the price one must pay for a good garden, and this

is, after all, about the only real payment made. All else yields such a large return that the payment is lost sight of.

When selecting varieties of plants and seeds always put quality first, earliness next, and yield next. Do not let the price bear much weight against the first requisite.

Where land is abundant make the garden extensive enough that the vegetables can be planted in rows which will permit of horse cultivation. The rows should be straight and comparatively long. This not only lightens labor but the work is done quickly when the weather is just right.

When covering root crops in the garden to remain there during the winter, they should first be covered to a depth of four inches until the weather gets cold enough to freeze, then the covering should be increased to a depth of ten inches. Leaves, straw, or manure added to this covering will keep all frost out

An essential to long keeping of roots is a thorough cooling before they are covered. A slight freezing will not injure any of the roots, with the exception of potatoes. The pile of roots may be three or

four feet wide at the base, and three feet deep at the ridge.

An easy and very regular way of seeding furrows is by means of the seed tape which is coming into very popular favor. This tape contains seed at the correct distance apart and much wear and tear on the backbone is saved, not to mention the saving in seed.

Keep tools sharpened and spray pumps oiled if you would do effective work. Never let the rust get ahead of you.

The most necessary tools for the garden are a good six-tine manure fork, a good meadow hoe measuring about eight inches across the blade and two and a half inches wide for men, a lighter one for a woman, a twelve- or fourteen-toothed iron rake, a round, pointed shovel, and, if the gardening is extensive, a hand seed-drill and wheel hoe, and a wheelbarrow. If a horse is used for cultivating, a small-tooth horse cultivator will be needed, preferably a spike-tooth cultivator with fourteen teeth. A fork, a trowel and a large spoon, will also be found necessary in performing many little tasks.

There is no better fence than the woven wire fence if made of good material and put up right. There

is little use in putting up a fence of wire that has a very light covering of galvanizing to protect it from the weather. Fences with wires running up and down, slipping upon those which cross, are of practically no value if there are any animals to work their way through.

Concrete posts will repay the cost many times over, but if wooden posts must be used, do not drive them into the ground, instead dig holes and set them in. A driven post in a frosty country will not stay in place long.

Killing weeds is only one object of cultivation. Conserving moisture and giving the roots breathing space are two very important objects.

The drier the land the more hoeing or cultivating should be done.

When a cover crop is necessary, sow rye. These plants will protect the soil from washing away, save soluble plant food, and add organic matter when plowed in. It can be sown any time up to the first of November, but the earlier it is done the stronger the growth before the ground freezes up.

In canning fruit, why not use a blue flame oil stove and *do the work out under the trees.* While

the fruit is cooking the worker can get a rest in a hammock and keep cool. Canning will not then be such a dreaded task. Protect the flame from the wind by means of a sheet of tin, if the stove has not been provided with a protector.

An efficiency bucket containing a big ball of strong cord of soft mesh, another ball of inch-wide strips of cloth, a pair of strong shears, a pair of small pruners, a fork, spoon, and trowel, and a pair of leather gloves will prove most valuable. Keep it handy.

Any vegetable from your garden will taste much sweeter if shared with someone who can have only market products.

See that the hoe is set at the right angle for your particular back. Hoes and chairs should be fitted to the person, and a blacksmith can do the job for ten cents, if you cannot do it yourself.

Vegetables are often spoiled in the cooking. Never boil them hard; it only tends to toughen them. They should always simmer or else boil very slowly.

When buying a thermometer for the greenhouse or

hotbed purchase one with the name of the maker on it, and one which has a Fahrenheit scale etched on the glass stem. You will then be more certain to get a good one.

A vegetable box lined with oilcloth, tacked neatly in all the corners, will be easy to keep clean and will save the icebox from much dirt.

One farmer has found that *twine strung around the field* with bits of white cloth tied on and fluttering here and there *is worth more than any number of scarecrows stuffed with straw.*

Keep the teeth of the harrow sharpened. They will dig in with greater vim and lighten the work.

Pollination is the carrying of the pollen of one flower to the stigma, or tip of the fruit of the same or another flower. Self-pollination means carrying to a like flower, and cross-pollination to a flower of another kind. Pollination is followed by actual fertilization, and if a flower is not fertilized by suitable pollen the fruit falls off or does not mature as it should. Hence the advisability of having more than one of a kind of plant.

The plan of the garden should include the grouping of perennial and small-fruit crops on one side of the garden where the necessary annual deep tillage will not interfere, and the rows should run the long way of the garden.

For systematic gardening, a record book is indispensable. Only by its diligent use can one be governed a second season from the experiences of the preceding year. The rainfall, temperature, cultivation, time of planting, etc., should be carefully noted of each plant.

For the systematic gardener, there is *a permanent label holder* which has a prong to be thrust into the ground. The label is covered with mica, thus protecting it from rain.

Little zinc labels which are covered by a transparent cover are very inexpensive and will last a long time.

When vines are planted near a wooden fence, they can easily be trained to climb over it if a few screws with wooden knobs are screwed into the fence. The wooden knobs will prevent the vines from being

cut by the screws after such fruits as cucumbers and other heavy fruit have attained a good size. This not only is an economical way of providing support for peas, beans, etc., but the fence is beautified as well.

Select the site for the various vegetables very carefully. You will gain a month or more with some vegetables by planting them in a protected place.

All garden planning should be done in January, that the work may be started out of doors just as soon as danger from frost is over.

A dose of nitrate of soda is very beneficial to *plants which need invigorating.* A teaspoonful is enough for a plant which attains a height of eighteen inches. Too large a dose is deadly.

Keep a pot of mint, a pot of parsley, lavender, and other favorite herbs in the kitchen window. They will not only provide garnishes for decorating the dishes, but they will be the means of providing great cheer to the kitchen worker as well, and because they are in view all the time, they will not be likely to suffer from lack of attention.

Do all grafting on a mild day. On a cold day, the wax will harden too quickly and on a hot day it will not have the proper consistency.

A small box or an old basket kept in a convenient place in the garden will be found most convenient for holding a ball of twine, a piece of wire, or a pair of old shears, and *many steps will be saved, and, what is most important, little jobs of work will be attended to when notice is first called to them,* instead of putting the work off until the next time a trip is made to the garden.

In tying plants and vines to a stake, be careful not to make the binding too tight or the stems will be bruised. A soft cord or green raffia should be used.

If flowers are to be planted among the vegetables, select the site carefully, particularly if there are perennials among them, otherwise the garden plan for the following season may mean destroying the flowers or giving them a long set-back.

In preparing a window box for herbs for the kitchen, place on the bottom of the box a layer of pebbles, stones, clinkers, or broken pottery as a drainage foundation. Next cover this with a layer of moss, both layers requiring a depth of three or four inches. There should be left room for ten or twelve

inches of soil and the soil should not come within an inch of the top of the box. In all, eighteen inches will be a good substantial depth for the box.

Place the kitchen window box level with the window that the plants may get all the sunlight possible. If the box is not made in such manner that it can be drained from a pipe extending beneath the box, a drip pan should be kept underneath to prevent the floor from being water-sogged after each watering.

Have a special place for the rubbish heap and have that special place quite a distance from the garden, otherwise the old vines, trash, etc., will be the means of hibernating a number of insects in a short while.

When gathering vegetables for storing during the winter months, select a bright, clear day, and after they are picked, hurry at once with them to the place where they are to be stored. Do not dump great quantities down in one place, bruising the leaves and roots, but pack away permanently at once.

The majority of vegetables are self-pollinating, i. e., they produce their own pollen and do not have to depend on that brought to them from other

plants by insects and butterflies, or by the wind. Among the self-pollinating vegetables are beans, peas, beets, onions, tomatoes, peppers, and egg-plants, while corn, pumpkins, squashes, cucumbers, and melons are propagated from the pollen of other plants.

Small chickens will really prove very beneficial to the vegetables which they never eat, such as carrots, peppers, celery, squashes, potatoes, cucumbers, and beans. They should be kept away from all berries and from beets, spinach, young cabbage plants, and lettuce.

When chickens have the run of the potato patch, be careful not to use a poisonous spray on the potatoes.

To insure posts from rotting in the ground, dig an extra large hole and fill with concrete. While the concrete is soft, set the post in the hold, being careful that there is enough concrete to entirely cover all of the buried portion of the post.

Have a seat somewhere in the garden. A few minutes' rest will enable the garden worker to accomplish a great deal more than if steady plugging is engaged in.

An excellent wax for use in grafting is made as follows: To a pound of beeswax add two pounds of resin and half a pint of linseed oil. Place over a slow fire and allow it to melt, stirring it until it is thoroughly mixed. Pour the melted mixture into a tub of cold water and stir it with a wooden spoon or pole until it has attained a very light shade. Store it away in a cool place until it is to be used.

When grafting plants or using any insecticide which is at all injurious to the skin, oil the hands thoroughly with sweet oil and the skin will not be harmed.

For the woman gardener to be becomingly dressed will not detract from the pleasure of gardening. Pretty *smocks* in many colors are to be had in the shops, and are easily made at home. They are easy to don and easy to iron.

A long-sleeved apron will prove very useful when working in the garden, and *an apron of oilcloth* will be invaluable when watering plants, kneeling on the damp ground or working among the vegetables when the dew has not yet left the foliage.

A sunbonnet should always be worn when working in the glaring sun, and particularly should a shade

be supplied for the eyes when working in or around the hotbed, as the glare from the glass will be very trying to the eyes.

When weeding or digging for a long while in one spot on a sunny day, a large umbrella planted in the ground near the bed will prove a great boon and will be the means of sparing the garden worker many a headache. Green is the best color to kill the glare of the sun's rays, though a black umbrella will serve the purpose very well indeed.

Garden gloves will protect the hands from scratches, bruises, and grime, and every gardener should have a pair. They can be had of chamois, asbestos, rubber, or heavy canvas, and the cost is slight. Asbestos gloves are perhaps the best wearing and afford the most protection for one who will not find a heavy glove a handicap.

Trays or bowls of asbestos or papier maché are excellent for use *when drying herbs*, as they do not absorb any moisture.

If you are planning a garden, send a postal card for the catalogues of the big nurseries. Even if you are not desirous of purchasing more seed, the

catalogues will give you excellent suggestions. The nurserymen are always glad to forward the catalogues for it will eventually mean more business for them.

And while you are gardening, *try to excel in some one line.* Have the prize tomato of the neighborhood, the finest celery, the largest heads of cabbage. Experiment and see what you can do. There is no greater joy on earth than making a discovery with nature's tools.

Study the catalogues of seedsmen and keep up-to-date on garden implements. In gardening as in carpentering, the best work cannot be done without proper tools. A few of the things which a gardener must have are:

Hoes of various sizes.
Spade.
Rake.
Measuring rod.
Weeding hooks.
Shears.
Hose.
Watering can.
Trowel.
Fork.
Mole trap.
Sprayer.

For the fruit grower there is manufactured *a*

fruit picker which will enable the fruit to be taken from the dress without bruises. This little article is indispensable when picking fruit that is to be stored away for any length of time.

A hedge of evergreen shrubs affords excellent protection for tender young vegetables if planted where it will break the north winds. By rotting cuttings from evergreens, the plants may be made to multiply and cover a large area in one or two seasons. The cuttings should be placed in a pot, or better still, a wooden box, and the soil should be kept uniformly moist.

One very successful method of rooting shrubbery cuttings is to take from the parent bush pieces having at least one joint and burying them in a paper cup which is set inside the cold-frame. The cuttings should be syringed daily and except at that time the cold-frame kept closed. The direct rays of the sun should not shine on them or they will be too warm and will dry out. This method usually starts roots very quickly and the cuttings should be hardened off gradually by allowing the cold-frame to be opened a little at a time each day until the roots have become accustomed to plenty of air.

LIST OF AGRICULTURAL EXPERIMENT STATIONS IN THE UNITED STATES AND ITS TERRITORIES

(These stations are maintained for the purpose of promoting agriculture, and the Directors will be glad to be of assistance in furnishing information with reference to their own States.)

Alabama	Tuskegee Auburn
Alaska	Sitka
Arizona	Tuscon
Arkansas	Fayetteville
California	Berkeley
Colorado	Fort Collins
Connecticut	New Haven Storrs
Delaware	Newark
Florida	Gainesville
Georgia	Experiment
Guam	Guam
Hawaii	Honolulu
Idaho	Moscow
Illinois	Urbana

Indiana	Lafayette
Iowa	Ames
Kansas	Manhattan
Kentucky	Lexington
Louisiana	Baton Rouge
Maine	Orono
Maryland	College Park
Massachusetts	Amherst
Michigan	East Lansing
Minnesota	St. Paul
Mississippi	Agricultural College
Missouri	Columbia
Montana	Bozeman
Nebraska	Lincoln
Nevada	Reno
New Hampshire	Durham
New Jersey	New Brunswick
New Mexico	State College
New York	Geneva Ithaca (Cornell College)
North Carolina	Raleigh
North Dakota	Agricultural College
Ohio	Wooster
Oklahoma	Stillwater
Oregon	Corvallis
Pennsylvania	State College
Porto Rico	Mayaquez
Rhode Island	Kingston
South Carolina	Clemson College
South Dakota	Brookings
Tennessee	Knoxville

Texas	College Station
Utah	Logan
Vermont	Burlington
Virginia	Blacksburg
Washington	Pullman
West Virginia	Morgantown
Wisconsin	Madison
Wyoming	Laramie.

PLAN FOR A FAMILY GARDEN

Vegetable	*When to Sow*	*Ready for Use*	*Follow by*
Lettuce	April	June	Parsley
Radishes	March	April	Lettuce
Onions	March	July	Turnip
Turnips	March	June	Carrots
Carrots	March	May	Onions
Swiss Chard	March	June	Continues all season
Radishes	April	May	Beans (green)
Beets	March	June	Continues until late
Beans (wax)	May	July	Beets (for winter)
Peas	April	June	Beans (green)

TABLE DENOTING HOW MUCH SPACE SHOULD BE DEVOTED TO VARIOUS VEGETABLES

Sweet corn	40 feet early in the season
" "	80 " later
Carrots	15 feet
Beets	15
Lettuce	18
Beans (snap)	40
Beans (Lima)	30
Peas	75
Onions	18
Tomatoes	30 plants
Melons	25 vines (for the year's supply)
Brussels Sprouts	50 feet (for winter and summer supply)
Cabbage	50 feet (for the year's supply)
Celery	40 stalks
Okra	25 plants (when eaten as vegetable)
Peppers	5 plants

CONVENIENT LISTS FOR THE GARDENER

To be sown indoors and transplanted later:

Beets	Leeks
Cabbages	Lettuce
Carrots	Muskmelons
Cauliflowers	Parsley
Celery	Tomatoes
Eggplants	Watermelons

Sown in frames and matured there for early crops:

Beets	
Carrots	Parsley
Chevril	Radishes
Cress	Spinach
Onions	Turnips

To be sown out of doors and transplanted later:

Brussels Sprouts	Celery
Cabbages	Endive
Cauliflowers	Kale
Celeriac	Kohl-rabi

To be sown where they are to grow:

Beans, snap
Beans, pole
Beans, lima
Beets
Carrots
Chard (Swiss)
Corn
Cucumbers
Leeks
Lettuce
Muskmelons
Okra
Onions
Parsley
Parsnips
Peas
Potatoes
Pumpkins
Radishes
Rutabaga
Salsify
Spinach
Squashes
Turnips
Watermelons.

A list of vegetables not injured by frosts:

Asparagus	Kohl-rabi	Parsnips	Rutabaga
Beets	Lettuce	Peas	Salsify
Cabbage	Onions	Radishes	Spinach
Carrots	Parsley	Rhubarb	Turnips

A list of vegetables which will readily be injured by frost:

Beans	Egg Plant	Squash
Cauliflower	Muskmelon	Swiss Chard
Celery	Pepper	Tomatoes
Cucumbers	Pumpkin	

THE FOLLOWING TWO TABLES ARE EXTRACTED FROM INFORMATION FURNISHED BY THE CORNELL EXPERIMENT STATION AT ITHACA, NEW YORK, AND ARE AS ACCURATE, PROBABLY, AS ANY TABLE COULD BE:

Name of vegetable	Seed for 100 ft.	Depth to plant seed (inches)
Artichokes, globe	1 oz.	½
Asparagus	60 to 80 plants	
Beans, dwarf	1 pt.	1
Beans, pole	½ pt.	1
Beets	2 oz.	½ to 1
Brussels sprouts	¼ oz.	½
Cabbage, early	¼ oz.	½
Cabbage, mid-season	¼ oz.	½
Cabbage, late	¼ oz.	½
Carrots	1 oz.	¼ to ½
Cauliflower	¼ oz.	½
Celery, early	¼ oz.	¼ or less
Celery, late	¼ oz.	¼ or less
Corn, early	¼ pt.	1 to 1½
Corn, late	¼ pt.	1 to 1½
Cucumbers	½ oz.	½ to 1
Dandelion	¼ oz.	½
Endive	1 oz.	½
Kale	¼ oz.	½
Kohlrabi	¼ oz.	½
Leek	½ oz.	½
Lettuce	½ oz.	½
Muskmelons	½ oz.	½ to 1
Onions	1 oz.	½
Parsley	¼ oz.	¼ to ½
Parsnips	½ oz.	¼ to ½
Peas, early	1 qt.	1 to 2
Peas, late	1 qt.	1 to 2
Peppers	⅛ oz.	½
Potatoes, early	5 to 8 lbs.	3 to 5
Potatoes, late	5 to 8 lbs.	3 to 5
Pumpkins	½ oz.	1 to 1½
Radishes	1 oz.	½
Salsify	1 oz.	½ to 1
Spinach	1 oz.	½
Squash	½ oz.	1 to 1½
Tomatoes	⅛ oz.	¼ to ½
Turnips	½ oz.	½
Watermelons	1 oz.	1 to 1½

Name of vegetable	Distance apart of plants in rows	Ready for use after planting
Artichokes, globe	2 to 3 ft.	15 months
Asparagus	12 in.	2 to 3 years
Beans, dwarf	3 to 4 in.	45 to 65 days
Beans, pole	3 to 4 in.	50 to 80 days
Beets	4 to 6 ft.	60 to 85 days
Brussels sprouts	12 to 18 in.	95 to 120 days
Cabbage, early	12 to 18 in.	90 to 100 days
Cabbage, mid-season	16 to 24 in.	100 to 120 days
Cabbage, late	20 to 30 in.	100 to 130 days
Carrots	2 to 3 in.	75 to 110 days
Cauliflower	14 to 18 in.	100 to 130 days
Celery, early	3 to 5 in.	120 to 130 days
Celery, late	4 to 8 in.	130 to 150 days
Corn, early	Hills 18 to 24 in.	65 to 90 days
Corn, late	Hills 30 to 36 in.	75 to 100 days
Cucumbers	Hills 4 ft.	60 to 80 days
Dandelion	12 to 18 in.	6 to 12 months
Endive	12 to 18 in.	90 to 130 days
Kale	18 in.	90 to 120 days
Kohlrabi	12 to 18 in.	60 to 80 days
Leek	4 to 8 in.	120 to 180 days
Lettuce	Head 10 in.	60 to 90 days
Muskmelons	Hills 6 ft.	120 to 150 days
Onions	2 in.	130 to 150 days
Parsley	3 to 6 in.	90 to 120 days
Parsnips	3 to 4 in.	125 to 160 days
Peas, early	Close	40 to 80 days
Peas, late	Close	65 to 90 days
Peppers	15 to 18 in.	100 to 140 days
Potatoes, early	12 to 14 in.	80 to 100 days
Potatoes, late	12 to 18 in.	100 to 140 days
Pumpkins	Hills 8 ft.	100 to 140 days
Radishes	1 in.	20 to 40 days
Salsify	4 to 6 in.	120 to 180 days
Spinach	3 to 4 in.	30 to 60 days
Squash	Hills 3 to 8 ft.	Bush 60 to 80 days, running 120 to 160 days
Tomatoes	1½ to 3 ft.	100 to 140 days
Turnips	6 to 10 in.	60 to 80 days
Watermelons	Hills 8 ft.	100 to 120 days

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